SEQUENCE LISTING

<110> Sherman, David H.
     Liu, Hung-Wen
     Xue, Yongquan
     Zhao, Lishan
     Regents of the University of Minnesota, et al.

<120> Promoter for Methymycin and Pikromycin

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<141> 2001-11-19

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4

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<212> PRT
<213> Streptomyces venezuelae

<400> 2

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Ala Ser Asn Pro Ala Ala Phe Trp Glu Leu Leu Arg Asn Gly Glu Ser
                20                  25                  30
Ala Val Thr Asp Val Pro Ser Gly Arg Trp Thr Ser Val Leu Gly Gly
            35                  40                  45
Ala Asp Ala Glu Glu Pro Ala Glu Ser Gly Val Arg Arg Gly Gly Phe
        50                  55                  60
Leu Asp Ser Leu Asp Leu Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro
65                  70                  75                  80
```

```
Arg Glu Ala Ala Ala Met Asp Pro Gln Gln Arg Leu Val Leu Glu Leu
            85                      90                      95
Ala Trp Glu Ala Leu Glu Asp Ala Gly Ile Val Pro Gly Thr Leu Ala
            100                     105                     110
Gly Ser Arg Thr Ala Val Phe Val Gly Thr Leu Arg Asp Asp Tyr Thr
        115                     120                     125
Ser Leu Leu Tyr Gln His Gly Glu Gln Ala Ile Thr Gln His Thr Met
        130                     135                     140
Ala Gly Val Asn Arg Gly Val Ile Ala Asn Arg Val Ser Tyr His Leu
145                     150                     155                     160
Gly Leu Gln Gly Pro Ser Leu Thr Val Asp Ala Ala Gln Ser Ser Ser
                165                     170                     175
Leu Val Ala Val His Leu Ala Cys Glu Ser Leu Arg Ala Gly Glu Ser
            180                     185                     190
Thr Thr Ala Leu Val Ala Gly Val Asn Leu Asn Ile Leu Ala Glu Ser
        195                     200                     205
Ala Val Thr Glu Glu Arg Phe Gly Gly Leu Ser Pro Asp Gly Thr Ala
    210                     215                     220
Tyr Thr Phe Asp Ala Arg Ala Asn Gly Phe Val Arg Gly Glu Gly Gly
225                     230                     235                     240
Gly Val Val Val Leu Lys Pro Leu Ser Arg Ala Leu Ala Asp Gly Asp
                245                     250                     255
Arg Val His Gly Val Ile Arg Ala Ser Ala Val Asn Asn Asp Gly Ala
            260                     265                     270
Thr Pro Gly Leu Thr Val Pro Ser Arg Ala Ala Gln Glu Lys Val Leu
            275                     280                     285
Arg Glu Ala Tyr Arg Lys Ala Ala Leu Asp Pro Ser Ala Val Gln Tyr
    290                     295                     300
Val Glu Leu His Gly Thr Gly Thr Pro Val Gly Asp Pro Ile Glu Ala
305                     310                     315                     320
Ala Ala Leu Gly Ala Val Leu Gly Ser Ala Arg Pro Ala Asp Glu Pro
                325                     330                     335
Leu Leu Val Gly Ser Ala Lys Thr Asn Val Gly His Leu Glu Gly Ala
                340                     345                     350
Ala Gly Ile Val Gly Leu Ile Lys Thr Leu Leu Ala Leu Gly Arg Arg
            355                     360                     365
Arg Ile Pro Ala Ser Leu Asn Phe Arg Thr Pro His Pro Asp Ile Pro
    370                     375                     380
Leu Asp Thr Leu Gly Leu Asp Val Pro Asp Gly Leu Arg Glu Trp Pro
385                     390                     395                     400
His Pro Asp Arg Glu Leu Leu Ala Gly Val Ser Ser Phe Gly Met Gly
                405                     410                     415
Gly Thr Asn Ala His Val Val Leu Ser Glu Gly Pro Ala Gln Gly Gly
            420                     425                     430
Glu Gln Pro Gly Ile Asp Glu Glu Thr Pro Val Asp Ser Gly Ala Ala
        435                     440                     445
Leu Pro Phe Val Val Thr Gly Arg Gly Gly Glu Ala Leu Arg Ala Gln
    450                     455                     460
Ala Arg Arg Leu His Glu Ala Val Glu Ala Asp Pro Glu Leu Ala Pro
465                     470                     475                     480
Ala Ala Leu Ala Arg Ser Leu Val Thr Thr Arg Thr Val Phe Thr His
                485                     490                     495
Arg Ser Val Val Leu Ala Pro Asp Arg Ala Arg Leu Leu Asp Gly Leu
            500                     505                     510
Gly Ala Leu Ala Ala Gly Thr Pro Ala Pro Gly Val Val Thr Gly Thr
        515                     520                     525
Pro Ala Pro Gly Arg Leu Ala Val Leu Phe Ser Gly Gln Gly Ala Gln
    530                     535                     540
Arg Thr Gly Met Gly Met Glu Leu Tyr Ala Ala His Pro Ala Phe Ala
545                     550                     555                     560
Thr Ala Phe Asp Ala Val Ala Ala Glu Leu Asp Pro Leu Leu Asp Arg
            565                     570                     575
```

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```
Pro Leu Ala Glu Leu Val Ala Ala Gly Asp Thr Leu Asp Arg Thr Val
        580                     585                     590
His Thr Gln Pro Ala Leu Phe Ala Val Glu Val Ala Leu His Arg Leu
        595                     600                     605
Val Glu Ser Trp Gly Val Thr Pro Asp Leu Leu Ala Gly His Ser Val
    610                     615                     620
Gly Glu Ile Ser Ala Ala His Val Ala Gly Val Leu Ser Leu Arg Asp
625                     630                     635                     640
Ala Ala Arg Leu Val Ala Ala Arg Gly Arg Leu Met Gln Ala Leu Pro
            645                     650                     655
Glu Gly Gly Ala Met Val Ala Val Glu Ala Ser Glu Glu Glu Val Leu
        660                     665                     670
Pro His Leu Ala Gly Arg Glu Arg Glu Leu Ser Leu Ala Ala Val Asn
        675                     680                     685
Gly Pro Arg Ala Val Val Leu Ala Gly Ala Glu Arg Ala Val Leu Asp
    690                     695                     700
Val Ala Glu Leu Leu Arg Glu Gln Gly Arg Arg Thr Lys Arg Leu Ser
705                     710                     715                     720
Val Ser His Ala Phe His Ser Pro Leu Met Glu Pro Met Leu Asp Asp
            725                     730                     735
Phe Arg Arg Val Val Glu Glu Leu Asp Phe Gln Glu Pro Arg Val Asp
            740                     745                     750
Val Val Ser Thr Val Thr Gly Leu Pro Val Thr Ala Gly Gln Trp Thr
        755                     760                     765
Asp Pro Glu Tyr Trp Val Asp Gln Val Arg Arg Pro Val Arg Phe Leu
    770                     775                     780
Asp Ala Val Arg Thr Leu Glu Glu Ser Gly Ala Asp Thr Phe Leu Glu
785                     790                     795                     800
Leu Gly Pro Asp Gly Val Cys Ser Ala Met Ala Ala Asp Ser Val Arg
            805                     810                     815
Asp Gln Glu Ala Ala Thr Ala Val Ser Ala Leu Arg Lys Gly Arg Pro
        820                     825                     830
Glu Pro Gln Ser Leu Leu Ala Ala Leu Thr Thr Val Phe Val Arg Gly
        835                     840                     845
His Asp Val Asp Trp Thr Ala Ala His Gly Ser Thr Gly Thr Val Arg
        850                     855                     860
Val Pro Leu Pro Thr Tyr Ala Phe Gln Arg Glu Arg His Trp Phe Asp
865                     870                     875                     880
Gly Ala Ala Arg Thr Ala Ala Pro Leu Thr Ala Gly Arg Ser Gly Thr
            885                     890                     895
Gly Ala Gly Thr Gly Pro Ala Ala Gly Val Thr Ser Gly Glu Gly Glu
            900                     905                     910
Gly Glu Gly Glu Gly Ala Gly Ala Gly Gly Gly Asp Arg Pro Ala Arg
        915                     920                     925
His Glu Thr Thr Glu Arg Val Arg Ala His Val Ala Ala Val Leu Glu
        930                     935                     940
Tyr Asp Asp Pro Thr Arg Val Glu Leu Gly Leu Thr Phe Lys Glu Leu
945                     950                     955                     960
Gly Phe Asp Ser Leu Met Ser Val Glu Leu Arg Asn Ala Leu Val Asp
            965                     970                     975
Asp Thr Gly Leu Arg Leu Pro Ser Gly Leu Leu Phe Asp His Pro Thr
            980                     985                     990
Pro Arg Ala Leu Ala Ala His Leu Gly Asp Leu Leu Thr Gly Gly Ser
        995                     1000                    1005
Gly Glu Thr Gly Ser Ala Asp Gly Ile Pro Pro Ala Thr Pro Ala Asp
    1010                    1015                    1020
Thr Thr Ala Glu Pro Ile Ala Ile Ile Gly Met Ala Cys Arg Tyr Pro
1025                    1030                    1035                    1040
Gly Gly Val Thr Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Glu Gly
            1045                    1050                    1055
Arg Asp Ala Val Ser Gly Leu Pro Thr Asp Arg Gly Trp Asp Glu Asp
        1060                    1065                    1070
```

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```
Leu Phe Asp Ala Asp Pro Asp Arg Ser Gly Lys Ser Ser Val Arg Glu
        1075                1080                1085
Gly Gly Phe Leu His Asp Ala Ala Leu Phe Asp Ala Gly Phe Phe Gly
        1090                1095                1100
Ile Ser Pro Arg Glu Ala Leu Gly Met Asp Pro Gln Gln Arg Leu Leu
1105                1110                1115                1120
Leu Glu Thr Ala Trp Glu Ala Val Glu Arg Ala Gly Leu Asp Pro Glu
            1125                1130                1135
Gly Leu Lys Gly Ser Arg Thr Ala Val Phe Val Gly Ala Thr Ala Leu
            1140                1145                1150
Asp Tyr Gly Pro Arg Met His Asp Gly Ala GLU Gly Val Glu Gly His
            1155                1160                1165
Leu Leu Thr Gly Thr Thr Pro Ser Val Met Ser Gly Arg Ile Ala Tyr
        1170                1175                1180
Gln Leu Gly Leu Thr Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser
1185                1190                1195                1200
Ser Ser Leu Val Ala Leu His Leu Ala Val Arg Ser Leu Arg Gln Gly
            1205                1210                1215
Glu Ser Ser Leu Ala Leu Ala Gly Gly Ala Thr Val Met Ser Thr Pro
        1220                1225                1230
Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala Asp Gly
        1235                1240                1245
Arg Ser Lys Ala Phe Ser Asp Ser Ala Asp Gly Thr Ser Trp Ala Glu
    1250                1255                1260
Gly Val Gly Leu Leu Val Val Glu Arg Leu Ser Asp Ala Glu Arg Asn
1265                1270                1275                1280
Gly His Pro Val Leu Ala Val Ile Arg Gly Ser Ala Val Asn Gln Asp
            1285                1290                1295
Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg
            1300                1305                1310
Val Ile Arg Gln Ala Leu Ala Asp Ala Gly Leu Thr Pro Ala Asp Val
        1315                1320                1325
Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile
    1330                1335                1340
Glu Ala Glu Ala Ile Leu Gly Thr Tyr Gly Arg Asp Arg Gly Glu Gly
1345                1350                1355                1360
Ala Pro Leu Gln Leu Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln
            1365                1370                1375
Ala Ala Ala Gly Val Gly Gly Leu Ile Lys Met Val Leu Ala Met Arg
        1380                1385                1390
His Gly Val Leu Pro Arg Thr Leu His Val Asp Arg Pro Thr Thr Arg
        1395                1400                1405
Val Asp Trp Glu Ala Gly Gly Val Glu Leu Leu Thr Glu Glu Arg Glu
    1410                1415                1420
Trp Pro Glu Thr Gly Arg Pro Arg Arg Ala Ala Ile Ser Ser Phe Gly
1425                1430                1435                1440
Ile Ser Gly Thr Asn Ala His Ile Val Val Glu Gln Ala Pro Glu Ala
            1445                1450                1455
Gly Glu Ala Ala Val Thr Thr Thr Ala Pro Glu Ala Gly Glu Ala Gly
            1460                1465                1470
Glu Ala Ala Asp Thr Thr Ala Thr Thr Pro Ala Ala Val Gly Val
        1475                1480                1485
Pro Glu Pro Val Arg Ala Pro Val Val Val Ser Ala Arg Asp Ala Ala
        1490                1495                1500
Ala Leu Arg Ala Gln Ala Val Arg Leu Arg Thr Phe Leu Asp Gly Arg
1505                1510                1515                1520
Pro Asp Val Thr Val Ala Asp Leu Gly Arg Ser Leu Ala Ala Arg Thr
            1525                1530                1535
Ala Phe Glu His Lys Ala Ala Leu Thr Thr Ala Thr Arg Asp Glu Leu
        1540                1545                1550
Leu Ala Gly Leu Asp Ala Leu Gly Arg Gly Glu Gln Ala Thr Gly Leu
        1555                1560                1565
```

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```
Val Thr Gly Glu Pro Ala Arg Ala Gly Arg Thr Ala Phe Leu Phe Thr
    1570                1575                1580
Gly Gln Gly Ala Gln Arg Val Ala Met Gly Glu Glu Leu Arg Ala Ala
1585                1590                1595                1600
His Pro Val Phe Ala Ala Ala Leu Asp Thr Val Tyr Ala Ala Leu Asp
            1605                1610                1615
Arg His Leu Asp Arg Pro Leu Arg Glu Ile Val Ala Ala Gly Glu Glu
            1620                1625                1630
Leu Asp Leu Thr Ala Tyr Thr Gln Pro Ala Leu Phe Ala Phe Glu Val
            1635                1640                1645
Ala Leu Phe Arg Leu Leu Glu His His Gly Leu Val Pro Asp Leu Leu
    1650                1655                1660
Thr Gly His Ser Val Gly Glu Ile Ala Ala Ala His Val Ala Gly Val
1665                1670                1675                1680
Leu Ser Leu Asp Asp Ala Ala Arg Leu Val Thr Ala Arg Gly Arg Leu
            1685                1690                1695
Met Gln Ser Ala Arg Glu Gly Gly Ala Met Ile Ala Val Gln Ala Gly
            1700                1705                1710
Glu Ala Glu Val Val Glu Ser Leu Lys Gly Tyr Glu Gly Arg Val Ala
    1715                1720                1725
Val Ala Ala Val Asn Gly Pro Thr Ala Val Val Val Ser Gly Asp Ala
    1730                1735                1740
Asp Ala Ala Glu Glu Ile Arg Ala Val Trp Ala Gly Arg Gly Arg Arg
1745                1750                1755                1760
Thr Arg Arg Leu Arg Val Ser His Ala Phe His Ser Pro His Met Asp
            1765                1770                1775
Asp Val Leu Asp Glu Phe Leu Arg Val Ala Glu Gly Leu Thr Phe Glu
            1780                1785                1790
Glu Pro Arg Ile Pro Val Val Ser Thr Val Thr Gly Ala Leu Val Thr
    1795                1800                1805
Ser Gly Glu Leu Thr Ser Pro Ala Tyr Trp Val Asp Gln Ile Arg Arg
    1810                1815                1820
Pro Val Arg Phe Leu Asp Ala Val Arg Thr Leu Ala Ala Gln Asp Ala
1825                1830                1835                1840
Thr Val Leu Val Glu Ile Gly Pro Asp Ala Val Leu Thr Ala Leu Ala
            1845                1850                1855
Glu Glu Ala Leu Ala Pro Gly Thr Asp Ala Pro Asp Ala Arg Asp Val
            1860                1865                1870
Thr Val Val Pro Leu Leu Arg Ala Gly Arg Pro Glu Pro Glu Thr Leu
    1875                1880                1885
Ala Ala Gly Leu Ala Thr Ala His Val His Gly Ala Pro Leu Asp Arg
    1890                1895                1900
Ala Ser Phe Phe Pro Asp Gly Arg Arg Thr Asp Leu Pro Thr Tyr Ala
1905                1910                1915                1920
Phe Arg Arg Glu His Tyr Trp Leu Thr Pro Glu Ala Arg Thr Asp Ala
            1925                1930                1935
Arg Ala Leu Gly Phe Asp Pro Ala Arg His Pro Leu Leu Thr Thr Thr
            1940                1945                1950
Val Glu Val Ala Gly Gly Asp Gly Val Leu Leu Thr Gly Arg Leu Ser
    1955                1960                1965
Leu Thr Asp Gln Pro Trp Leu Ala Asp His Met Val Asn Gly Ala Val
    1970                1975                1980
Leu Leu Pro Ala Thr Ala Phe Leu Glu Leu Ala Leu Ala Ala Gly Asp
1985                1990                1995                2000
His Val Gly Ala Val Arg Val Glu Glu Leu Thr Leu Glu Ala Pro Leu
            2005                2010                2015
Val Leu Pro Glu Arg Gly Ala Val Arg Ile Gln Val Gly Val Ser Gly
            2020                2025                2030
Asp Gly Glu Ser Pro Ala Gly Arg Thr Phe Gly Val Tyr Ser Thr Pro
            2035                2040                2045
Asp Ser Gly Asp Thr Gly Asp Asp Ala Pro Arg Glu Trp Thr Arg His
    2050                2055                2060
```

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```
Val Ser Gly Val Leu Gly Glu Gly Asp Pro Ala Thr Glu Ser Asp His
2065                2070                2075                2080
Pro Gly Thr Asp Gly Asp Gly Ser Ala Ala Trp Pro Pro Ala Ala Ala
                2085                2090                2095
Thr Ala Thr Pro Leu Asp Gly Val Tyr Asp Arg Leu Ala Glu Leu Gly
                2100                2105                2110
Tyr Gly Tyr Gly Pro Ala Phe Gln Gly Leu Thr Gly Leu Trp Arg Asp
                2115                2120                2125
Gly Ala Asp Thr Leu Ala Glu Ile Arg Leu Pro Ala Ala Gln His Glu
                2130                2135                2140
Ser Ala Gly Leu Phe Gly Val His Pro Ala Leu Leu Asp Ala Ala Leu
2145                2150                2155                2160
His Pro Ile Val Leu Glu Gly Asn Ser Ala Ala Gly Ala Cys Asp Ala
                2165                2170                2175
Asp Thr Asp Ala Thr Asp Arg Ile Arg Leu Pro Phe Ala Trp Ala Gly
                2180                2185                2190
Val Thr Leu His Ala Glu Gly Ala Thr Ala Leu Arg Val Arg Ile Thr
                2195                2200                2205
Pro Thr Gly Pro Asp Thr Val Thr Leu Arg Leu Thr Asp Thr Thr Gly
                2210                2215                2220
Ala Pro Val Ala Thr Val Glu Ser Leu Thr Leu Arg Ala Val Ala Lys
2225                2230                2235                2240
Asp Arg Leu Gly Thr Thr Ala Gly Arg Val Asp Asp Ala Leu Phe Thr
                2245                2250                2255
Val Val Trp Thr Glu Thr Gly Thr Pro Glu Pro Ala Gly Arg Gly Ala
                2260                2265                2270
Val Glu Val Glu Glu Leu Val Asp Leu Ala Gly Leu Gly Asp Leu Val
                2275                2280                2285
Glu Leu Gly Ala Ala Asp Val Val Leu Arg Ala Asp Arg Trp Thr Leu
                2290                2295                2300
Asp Gly Asp Pro Ser Ala Ala Ala Arg Thr Ala Val Arg Arg Thr Leu
2305                2310                2315                2320
Ala Ile Val Gln Glu Phe Leu Ser Glu Pro Arg Phe Asp Gly Ser Arg
                2325                2330                2335
Leu Val Cys Val Thr Arg Gly Ala Val Ala Ala Leu Pro Gly Glu Asp
                2340                2345                2350
Val Thr Ser Leu Ala Thr Gly Pro Leu Trp Gly Leu Val Arg Ser Ala
                2355                2360                2365
Gln Ser Glu Asn Pro Gly Arg Leu Phe Leu Leu Asp Leu Gly Glu Gly
                2370                2375                2380
Glu Gly Glu Arg Asp Gly Ala Glu Glu Leu Ile Arg Ala Ala Thr Ala
2385                2390                2395                2400
Gly Asp Glu Pro Gln Leu Ala Ala Arg Asp Gly Arg Leu Leu Ala Pro
                2405                2410                2415
Arg Leu Ala Arg Thr Ala Ala Leu Ser Ser Glu Asp Thr Ala Gly Gly
                2420                2425                2430
Ala Asp Arg Phe Gly Pro Asp Gly Thr Val Leu Val Thr Gly Gly Thr
                2435                2440                2445
Gly Gly Leu Gly Ala Leu Leu Ala Arg His Leu Val Glu Arg His Gly
2450                2455                2460
Val Arg Arg Leu Leu Leu Val Ser Arg Arg Gly Ala Asp Ala Pro Gly
2465                2470                2475                2480
Ala Ala Asp Leu Gly Glu Asp Leu Ala Gly Leu Gly Ala Glu Val Ala
                2485                2490                2495
Phe Ala Ala Ala Asp Ala Ala Asp Arg Glu Ser Leu Ala Arg Ala Ile
                2500                2505                2510
Ala Thr Val Pro Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala
                2515                2520                2525
Gly Val Val Asp Asp Ala Thr Val Glu Ala Leu Thr Pro Glu Arg Leu
                2530                2535                2540
Asp Ala Val Leu Arg Pro Lys Val Asp Ala Ala Trp Asn Leu His Glu
2545                2550                2555                2560
```

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```
Leu Thr Lys Asp Leu Arg Leu Asp Ala Phe Val Leu Phe Ser Ser Val
        2565                2570                2575
Ser Gly Ile Val Gly Thr Ala Gly Gln Ala Asn Tyr Ala Ala Ala Asn
        2580                2585                2590
Thr Gly Leu Asp Ala Leu Ala Ala His Arg Ala Ala Thr Gly Leu Ala
        2595                2600                2605
Ala Thr Ser Leu Ala Trp Gly Leu Trp Asp Gly Thr His Gly Met Gly
    2610                2615                2620
Gly Thr Leu Gly Ala Ala Asp Leu Ala Arg Trp Ser Arg Ala Gly Ile
2625                2630                2635                2640
Thr Pro Leu Thr Pro Leu Gln Gly Leu Ala Leu Phe Asp Ala Ala Val
        2645                2650                2655
Ala Arg Asp Asp Ala Leu Leu Val Pro Ala Gly Leu Arg Pro Thr Ala
        2660                2665                2670
His Arg Gly Thr Asp Gly Gln Pro Pro Ala Leu Trp Arg Gly Leu Val
        2675                2680                2685
Arg Ala Arg Pro Arg Arg Ala Ala Arg Thr Ala Ala Glu Ala Ala Asp
        2690                2695                2700
Thr Thr Gly Gly Trp Leu Ser Gly Leu Ala Ala Gln Ser Pro Glu Glu
2705                2710                2715                2720
Arg Arg Ser Thr Ala Val Thr Leu Val Thr Gly Val Val Ala Asp Val
        2725                2730                2735
Leu Gly His Ala Asp Ser Ala Ala Val Gly Ala Glu Arg Ser Phe Lys
        2740                2745                2750
Asp Leu Gly Phe Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu
        2755                2760                2765
Asn Ala Ala Thr Gly Leu Arg Leu Pro Ala Thr Thr Val Phe Asp His
        2770                2775                2780
Pro Ser Pro Ala Ala Leu Ala Ser His Leu Leu Ala Gln Val Pro Gly
2785                2790                2795                2800
Leu Lys Glu Gly Thr Ala Ala Thr Ala Thr Val Val Ala Glu Arg Gly
        2805                2810                2815
Ala Ser Phe Gly Asp Arg Ala Thr Asp Asp Pro Ile Ala Ile Val
        2820                2825                2830
Gly Met Ala Cys Arg Tyr Pro Gly Gly Val Ser Ser Pro Glu Asp Leu
        2835                2840                2845
Trp Arg Leu Val Ala Glu Gly Thr Asp Ala Ile Ser Glu Phe Pro Val
    2850                2855                2860
Asn Arg Gly Trp Asp Leu Glu Ser Leu Tyr Asp Pro Asp Pro Glu Ser
2865                2870                2875                2880
Lys Gly Thr Thr Tyr Cys Arg Glu Gly Gly Phe Leu Glu Gly Ala Gly
        2885                2890                2895
Asp Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Val
        2900                2905                2910
Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Val Ser Trp Glu Ala Leu
        2915                2920                2925
Glu Arg Ala Gly Ile Asp Pro Ser Ser Leu Arg Gly Ser Arg Gly Gly
        2930                2935                2940
Val Tyr Val Gly Ala Ala His Gly Ser Tyr Ala Ser Asp Pro Arg Leu
2945                2950                2955                2960
Val Pro Glu Gly Ser Glu Gly Tyr Leu Leu Thr Gly Ser Ala Asp Ala
        2965                2970                2975
Val Met Ser Gly Arg Ile Ser Tyr Ala Leu Gly Leu Glu Gly Pro Ser
        2980                2985                2990
Met Thr Val Glu Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
        2995                3000                3005
Ala Val Arg Ala Leu Arg His Gly Glu Cys Gly Leu Ala Leu Ala Gly
        3010                3015                3020
Gly Val Ala Val Met Ala Asp Pro Ala Ala Phe Val Glu Phe Ser Arg
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Gln Lys Gly Leu Ala Ala Asp Gly Arg Cys Lys Ala Phe Ser Ala Ala
        3045                3050                3055


                                11
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Ala Asp Gly Thr Gly Trp Ala Glu Gly Val Gly Val Leu Val Leu Glu
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Arg Leu Ser Asp Ala Arg Arg Ala Gly His Thr Val Leu Gly Leu Val
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Thr Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala
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Pro Asn Gly Pro Ala Gln Gln Arg Val Ile Ala Glu Ala Leu Ala Asp
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Ala Gly Leu Ser Pro Glu Asp Val Asp Ala Val Glu Ala His Gly Thr
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Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gly Ala Leu Leu Ala Ala
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Ser Gly Arg Asn Arg Ser Gly Asp His Pro Leu Trp Leu Gly Ser Leu
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Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala Gly Val Gly Gly Val
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Ile Lys Met Leu Gln Ala Leu Arg His Gly Leu Leu Pro Arg Thr Leu
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His Ala Asp Glu Pro Thr Pro His Ala Asp Trp Ser Ser Gly Arg Val
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Arg Leu Leu Thr Ser Glu Val Pro Trp Gln Arg Thr Gly Arg Pro Arg
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Arg Thr Gly Val Ser Ala Phe Gly Val Gly Gly Thr Asn Ala His Val
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Val Leu Glu Glu Ala Pro Ala Pro Pro Ala Pro Glu Pro Ala Gly Glu
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Trp Val Val Ser Gly Arg Asp Glu Pro Ala Leu Arg Ser Gln Ala Arg
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Arg Leu Arg Asp His Leu Ser Arg Thr Pro Gly Ala Arg Pro Arg Asp
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Ile Ala Phe Ser Leu Ala Ala Thr Arg Ala Ala Phe Asp His Arg Ala
          3315                3320                3325
Val Leu Ile Gly Ser Asp Gly Ala Glu Leu Ala Ala Ala Leu Asp Ala
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Leu Ala Glu Gly Arg Asp Gly Pro Ala Val Val Arg Gly Val Arg Asp
3345                3350                3355                3360
Arg Asp Gly Arg Met Ala Phe Leu Phe Thr Gly Gln Gly Ser Gln Arg
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Ala Gly Met Ala His Asp Leu His Ala Ala His Thr Phe Phe Ala Ser
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Ala Leu Asp Glu Val Thr Asp Arg Leu Asp Pro Leu Leu Gly Arg Pro
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Leu Gly Ala Leu Leu Asp Ala Arg Pro Gly Ser Pro Glu Ala Ala Leu
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Leu Gly His Ser Val Gly Glu Leu Ala Ala Ala His Val Ala Gly Val
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Leu Asp Leu Asp Asp Ala Cys Ala Leu Val Ala Ala Arg Gly Arg Leu
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Met Gln Arg Leu Pro Pro Gly Gly Ala Met Val Ser Val Arg Ala Gly
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Glu Asp Glu Val Arg Ala Leu Leu Ala Gly Arg Glu Asp Ala Val Cys
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Val Ala Ala Val Asn Gly Pro Arg Ser Val Val Ile Ser Gly Ala Glu
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Glu Ala Val Ala Glu Ala Ala Ala Gln Leu Ala Gly Arg Gly Arg Arg
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Glu Pro Glu Leu Thr Val Val Ser Thr Val Thr Gly Arg Pro Ala Arg
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Pro Gly Glu Leu Thr Gly Pro Asp Tyr Trp Val Ala Gln Val Arg Glu
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Pro Val Arg Phe Ala Asp Ala Val Arg Thr Ala His Arg Leu Gly Ala
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Arg Thr Phe Leu Glu Thr Gly Pro Asp Gly Val Leu Cys Gly Met Ala
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Lys Pro Gly Thr Ala Pro His Gly Pro Ala Ala Pro Gly Ala Leu Arg
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Met His Ala Asp Gly Pro Glu Gly Pro Ala Arg Arg Val Glu Leu Pro
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Val His Ala Phe Arg His Arg Arg Tyr Trp Leu Ala Pro Gly Arg Ala
    3715                3720                3725
Ala Asp Thr Asp Asp Trp Met Tyr Arg Ile Gly Trp Asp Arg Leu Pro
    3730                3735                3740
Ala Val Thr Gly Gly Ala Arg Thr Ala Gly Arg Trp Leu Val Ile His
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Pro Asp Ser Pro Arg Cys Arg Glu Leu Ser Gly His Ala Glu Arg Ala
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Leu Arg Ala Ala Gly Ala Ser Pro Val Pro Leu Pro Val Asp Ala Pro
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Ala Ala Asp Arg Ala Ser Phe Ala Ala Leu Leu Arg Ser Ala Thr Gly
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Leu Leu Ser Glu Glu Asp Arg Pro His Arg Gln His Ala Pro Val Pro
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Ala Gly Val Leu Ala Thr Leu Ser Leu Met Gln Ala Met Glu Glu Glu
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Gly Arg Val Ala Ala Leu Glu Arg Pro Thr Arg Trp Gly Gly Leu Val
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Asp Leu Pro Ala Ser Pro Gly Ala Ala His Trp Ala Ala Ala Val Glu
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Phe Ala Ala Cys Asp Thr Ala Asp Arg Asp Gly Leu Ala Arg Val Leu
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Ser Gly Ala Gly Val Trp Gly Ser Ala Gly Gln Gly Ala Tyr Ala Ala
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Ala Asn Ala Ala Leu Asp Ala Leu Ala Arg Arg Arg Ala Ala Asp Gly
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Leu Pro Ala Thr Ser Ile Ala Trp Gly Val Trp Gly Gly Gly Gly Met
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Gly Ala Asp Glu Ala Gly Ala Glu Tyr Leu Gly Arg Arg Gly Met Arg
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Pro Met Ala Pro Val Ser Ala Leu Arg Ala Met Ala Thr Ala Ile Ala
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Ser Gly Glu Pro Cys Pro Thr Val Thr His Thr Asp Trp Glu Arg Phe
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Gly Glu Gly Phe Thr Ala Phe Arg Pro Ser Pro Leu Ile Ala Gly Leu
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Gly Thr Pro Gly Gly Gly Arg Ala Ala Glu Thr Pro Glu Glu Gly Asn
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Thr Ala Leu Arg Glu Leu Val Arg Ala Arg Thr Ala Ala Ala Leu Gly
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Leu Asp Asp Pro Ala Glu Val Ala Glu Gly Glu Arg Phe Pro Ala Met
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Gly Phe Asp Ser Leu Ala Thr Val Arg Leu Arg Arg Gly Leu Ala Ser
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Ala Thr Gly Leu Asp Leu Pro Pro Asp Leu Leu Phe Asp Arg Asp Thr
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Pro Ala Ala Leu Ala Ala His Leu Ala Glu Leu Leu Ala Thr Ala Arg
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Asp His Gly Pro Gly Gly Pro Gly Thr Gly Ala Ala Pro Ala Asp Ala
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Gly Ser Gly Leu Pro Ala Leu Tyr Arg Glu Ala Val Arg Thr Gly Arg
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Asp Gly Ala Glu Asp Thr Gly Leu Pro Leu Leu Val Gly Cys Ala Gly
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Glu Ala Gln Ala Glu Ala Leu Leu Arg Tyr Ala Ala Gly Arg Pro Phe
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Val Leu Leu Gly His Ser Ala Gly Ala Asn Met Ala His Ala Leu Thr
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Arg His Leu Glu Ala Asn Gly Gly Gly Pro Ala Gly Leu Val Leu Met
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Asp Ile Tyr Thr Pro Ala Asp Pro Gly Ala Met Gly Val Trp Arg Asn
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Asp Met Phe Gln Trp Val Trp Arg Arg Ser Asp Ile Pro Pro Asp Asp
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His Arg Leu Thr Ala Met Gly Ala Tyr His Arg Leu Leu Leu Asp Trp
    4530                4535                4540
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Met Thr Glu His Ala Ser Ala Ala Ala Arg Leu Val His Gly Trp Leu
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Gly Arg Glu Glu Arg Pro
4625                4630


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17

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<213> Streptomyces venezuelae

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Thr Arg Gly Ile His Trp Ile His Ala Ala Asn Gly Asp Pro Tyr Ala
        35   40   45
Thr Val Leu Arg Gly Gln Ala Asp Asp Pro Tyr Pro Ala Tyr Glu Arg
    50   55   60
Val Arg Ala Arg Gly Ala Leu Ser Phe Ser Pro Thr Gly Ser Trp Val
65   70   75   80
Thr Ala Asp His Ala Leu Ala Ala Ser Ile Leu Cys Ser Thr Asp Phe
                85   90   95
Gly Val Ser Gly Ala Asp Gly Val Pro Val Pro Gln Gln Val Leu Ser
            100   105   110
Tyr Gly Glu Gly Cys Pro Leu Glu Arg Glu Gln Val Leu Pro Ala Ala
        115   120   125
Gly Asp Val Pro Glu Gly Gly Gln Arg Ala Val Val Glu Gly Ile His
    130   135   140
Arg Glu Thr Leu Glu Gly Leu Ala Pro Asp Pro Ser Ala Ser Tyr Ala
145   150   155   160
Phe Glu Leu Leu Gly Gly Phe Val Arg Pro Ala Val Thr Ala Ala Ala
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Ala Ala Val Leu Gly Val Pro Ala Asp Arg Arg Ala Asp Phe Ala Asp
            180   185   190
Leu Leu Glu Arg Leu Arg Pro Leu Ser Asp Ser Leu Leu Ala Pro Gln
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Ser Leu Arg Thr Val Arg Ala Ala Asp Gly Ala Leu Ala Glu Leu Thr
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Leu Leu Ala His Pro Glu Gln Trp Arg Glu Leu Cys Asp Arg Pro Gly
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Leu Ala Ala Ala Ala Val Glu Glu Thr Leu Arg Tyr Asp Pro Pro Val
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Gln Leu Asp Ala Arg Val Val Arg Gly Glu Thr Glu Leu Ala Gly Arg
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Arg Leu Pro Ala Gly Ala His Val Val Val Leu Thr Ala Ala Thr Gly
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Pro Asp Ala Ala Ala His Leu Ala Leu His Pro Ala Gly Pro Tyr Gly
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Pro Val Ala Ser Leu Val Arg Leu Gln Ala Glu Val Ala Leu Arg Thr
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Leu Ala Gly Arg Phe Pro Gly Leu Arg Gln Ala Gly Asp Val Leu Arg
    370   375   380
Pro Arg Arg Ala Pro Val Gly Arg Gly Pro Leu Ser Val Pro Val Ser
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Ser Ser Met Arg Val Leu Leu Thr Ser Phe Ala His His Thr His Tyr
                405   410   415
Tyr Gly Leu Val Pro Leu Ala Trp Ala Leu Leu Ala Ala Gly His Glu
            420   425   430
Val Arg Val Ala Ser Gln Pro Ala Leu Thr Asp Thr Ile Thr Gly Ser
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Arg Val Arg Met Ala Gly Glu Pro Arg Pro Asn His Pro Ala Ile Ala
465                 470                 475                 480
Phe Asp Glu Ala Arg Pro Glu Pro Leu Asp Trp Asp His Ala Leu Gly
                485                 490                 495
Ile Glu Ala Ile Leu Ala Pro Tyr Phe His Leu Leu Ala Asn Asn Asp
                500                 505                 510
Ser Met Val Asp Asp Leu Val Asp Phe Ala Arg Ser Trp Gln Pro Asp
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Leu Val Leu Trp Glu Pro Thr Thr Tyr Ala Gly Ala Val Ala Ala Gln
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Val Thr Gly Ala Ala His Ala Arg Val Leu Trp Gly Pro Asp Val Met
545                 550                 555                 560
Gly Ser Ala Arg Arg Lys Phe Val Ala Leu Arg Asp Arg Gln Pro Pro
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Glu His Arg Glu Asp Pro Thr Ala Glu Trp Leu Thr Trp Thr Leu Asp
            580                 585                 590
Arg Tyr Gly Ala Ser Phe Glu Glu Glu Leu Leu Thr Gly Gln Phe Thr
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Ile Asp Pro Thr Pro Pro Ser Leu Arg Leu Asp Thr Gly Leu Pro Thr
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Val Gly Met Arg Tyr Val Pro Tyr Asn Gly Thr Ser Val Val Pro Asp
625                 630                 635                 640
Trp Leu Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Leu Thr Leu Gly
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Val Ser Ala Arg Glu Val Leu Gly Gly Asp Gly Val Ser Gln Gly Asp
            660                 665                 670
Ile Leu Glu Ala Leu Ala Asp Leu Asp Ile Glu Leu Val Ala Thr Leu
        675                 680                 685
Asp Ala Ser Gln Arg Ala Glu Ile Arg Asn Tyr Pro Lys His Thr Arg
    690                 695                 700
Phe Thr Asp Phe Val Pro Met His Ala Leu Leu Pro Ser Cys Ser Ala
705                 710                 715                 720
Ile Ile His His Gly Gly Ala Gly Thr Tyr Ala Thr Ala Val Ile Asn
                725                 730                 735
Ala Val Pro Gln Val Met Leu Ala Glu Leu Trp Asp Ala Pro Val Lys
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Ala Arg Ala Val Ala Glu Gln Gly Ala Gly Phe Phe Leu Pro Pro Ala
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Glu Leu Thr Pro Gln Ala Val Arg Asp Ala Val Val Arg Ile Leu Asp
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Asp Pro Ser Val Ala Thr Ala Ala His Arg Leu Arg Glu Glu Thr Phe
785                 790                 795                 800
Gly Asp Pro Thr Pro Ala Gly Ile Val Pro Glu Leu Glu Arg Leu Ala
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Ala Gln His Arg Arg Pro Pro Ala Asp Ala Arg His Met Tyr Glu Val
            820                 825                 830
Asp His Ala Asp Val Tyr Asp Leu Phe Tyr Leu Gly Arg Gly Lys Asp
        835                 840                 845
Tyr Ala Ala Glu Ala Ser Asp Ile Ala Asp Leu Val Arg Ser Arg Thr
    850                 855                 860
Pro Glu Ala Ser Ser Leu Leu Asp Val Ala Cys Gly Thr Gly Thr His
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Leu Glu His Phe Thr Lys Glu Phe Gly Asp Thr Ala Gly Leu Glu Leu
                885                 890                 895
Ser Glu Asp Met Leu Thr His Ala Arg Lys Arg Leu Pro Asp Ala Thr
            900                 905                 910
Leu His Gln Gly Asp Met Arg Asp Phe Arg Leu Gly Arg Lys Phe Ser
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Ala Val Val Ser Met Phe Ser Ser Val Gly Tyr Leu Lys Thr Thr Glu
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Gly Val Val Val Val Glu Pro Trp Trp Phe Pro Glu Thr Phe Ala Asp
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Gly Trp Val Ser Ala Asp Val Val Arg Arg Asp Gly Arg Thr Val Ala
                980                 985                 990
Arg Val Ser His Ser Val Arg Glu Gly Asn Ala Thr Arg Met Glu Val
                995                 1000                1005
His Phe Thr Val Ala Asp Pro Gly Lys Gly Val Arg His Phe Ser Asp
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Val His Leu Ile Thr Leu Phe His Gln Ala Glu Tyr Glu Ala Ala Phe
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Arg Leu Val Gly Gln Thr Ala Thr Ala Leu Pro Ala Pro Val Ala Leu
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Ala Ser Thr Phe Asp Asp Thr Met Ala Asp Ser Tyr Gly Lys Val Met
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Gly Arg Asp Gly Arg Ala Leu Asn Gln Asp Met Val Leu Gly Pro Met
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Met Asn Asn Ile Arg Val Pro His Gly Gly Arg Asn Tyr Glu Thr Phe
                1220                1225                1230
Ser Glu Asp Pro Leu Val Ser Ser Arg Thr Ala Val Ala Gln Ile Lys
    1235                1240                1245
Gly Ile Gln Gly Ala Gly Leu Met Thr Thr Ala Lys His Phe Ala Ala
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Asn Asn Gln Glu Asn Asn Arg Phe Ser Val Asn Ala Asn Val Asp Glu
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Gln Thr Leu Arg Glu Ile Glu Phe Pro Ala Phe Glu Ala Ser Ser Lys
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Tyr Asp Gly Thr Leu Thr Val Pro Ala Asp Gly Glu Tyr Arg Ile Ala
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Ile Glu Ala Gly Gln Val Tyr Gly Lys Val Ser Ser Pro Leu Leu Lys
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Gly Phe Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val
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         1955                1960                1965
Ala Ser Trp Leu Ala Val Ser Ala Thr Gly Ala Thr Pro Val Pro Val
    1970                1975                1980
Glu Pro His Glu Asp His Pro Thr Leu Asp Pro Leu Leu Val Glu Lys
1985                1990                1995                2000
Ala Ile Thr Pro Arg Thr Arg Ala Leu Leu Pro Val His Leu Tyr Gly
         2005                2010                2015
His Pro Ala Asp Met Asp Ala Leu Arg Glu Leu Ala Asp Arg His Gly
         2020                2025                2030
Leu His Ile Val Glu Asp Ala Ala Gln Ala His Gly Ala Arg Tyr Arg
         2035                2040                2045
Gly Arg Arg Ile Gly Ala Gly Ser Ser Val Ala Ala Phe Ser Phe Tyr
    2050                2055                2060
Pro Gly Lys Asn Leu Gly Cys Phe Gly Asp Gly Gly Ala Val Val Thr
2065                2070                2075                2080
Gly Asp Pro Glu Leu Ala Glu Arg Leu Arg Met Leu Arg Asn Tyr Gly
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Ser Arg Gln Lys Tyr Ser His Glu Thr Lys Gly Thr Asn Ser Arg Leu
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Asp Glu Met Gln Ala Ala Val Leu Arg Ile Arg Leu Ala His Leu Asp
         2115                2120                2125
Ser Trp Asn Gly Arg Arg Ser Ala Leu Ala Ala Glu Tyr Leu Ser Gly
    2130                2135                2140
Leu Ala Gly Leu Pro Gly Ile Gly Leu Pro Val Thr Ala Pro Asp Thr
2145                2150                2155                2160
Asp Pro Val Trp His Leu Phe Thr Val Arg Thr Glu Arg Arg Asp Glu
         2165                2170                2175
Leu Arg Ser His Leu Asp Ala Arg Gly Ile Asp Thr Leu Thr His Tyr
         2180                2185                2190
Pro Val Pro Val His Leu Ser Pro Ala Tyr Ala Gly Glu Ala Pro Pro
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Glu Gly Ser Leu Pro Arg Ala Glu Ser Phe Ala Arg Gln Val Leu Ser
2210                2215                2220
Leu Pro Ile Gly Pro His Leu Glu Arg Pro Gln Ala Leu Arg Val Ile
2225                2230                2235                2240
Asp Ala Val Arg Glu Trp Ala Glu Arg Val Asp Gln Ala Met Arg Leu
         2245                2250                2255
Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe Val Arg Gln
         2260                2265                2270
Leu Leu Ala Gly Ala Tyr Pro Asp Val Pro Ala Asp Glu Val Ile Val
         2275                2280                2285
Leu Asp Ser Leu Thr Tyr Ala Gly Asn Arg Ala Asn Leu Ala Pro Val
         2290                2295                2300
Asp Ala Asp Pro Arg Leu Arg Phe Val His Gly Asp Ile Arg Asp Ala
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Gly Leu Leu Ala Arg Glu Leu Arg Gly Val Asp Ala Ile Val His Phe
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Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Gly Ala Ser Val Phe
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Thr Glu Thr Asn Val Gln Gly Thr Gln Thr Leu Leu Gln Cys Ala Val
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Asp Ala Gly Val Gly Arg Val Val His Val Ser Thr Asp Glu Val Tyr
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Gly Ser Ile Asp Ser Gly Ser Trp Thr Glu Ser Ser Pro Leu Glu Pro
2385                2390                2395                2400
Asn Ser Pro Tyr Ala Ala Ser Lys Ala Gly Ser Asp Leu Val Ala Arg
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Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Ile Thr Arg Cys Cys
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Val Thr Asn Leu Leu Asp Gly Gly Thr Leu Pro Leu Tyr Gly Asp Gly
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Ala Asn Val Arg Glu Trp Val His Thr Asp Asp His Cys Arg Gly Ile
2465                2470                2475                2480
Ala Leu Val Leu Ala Gly Gly Arg Ala Gly Glu Ile Tyr His Ile Gly
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Gly Gly Leu Glu Leu Thr Asn Arg Glu Leu Thr Gly Ile Leu Leu Asp
        2500                2505                2510
Ser Leu Gly Ala Asp Trp Ser Ser Val Arg Lys Val Ala Asp Arg Lys
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Gly His Asp Leu Arg Tyr Ser Leu Asp Gly Gly Glu Ile Glu Arg Glu
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Leu Gly Tyr Arg Pro Gln Val Ser Phe Ala Asp Gly Leu Ala Arg Thr
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Val Arg Trp Tyr Arg Glu Asn Arg Gly Trp Trp Glu Pro Leu Lys Ala
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Thr Ala Pro Gln Leu Pro Ala Thr Ala Val Glu Val Ser Ala Met Lys
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Gly Ile Val Leu Ala Gly Gly Ser Gly Thr Arg Leu His Pro Ala Thr
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Ser Val Ile Ser Lys Gln Ile Leu Pro Val Tyr Asn Lys Pro Met Ile
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Tyr Tyr Pro Leu Ser Val Leu Met Leu Gly Gly Ile Arg Glu Ile Gln
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Ile Ile Ser Thr Pro Gln His Ile Glu Leu Phe Gln Ser Leu Leu Gly
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Asn Gly Arg His Leu Gly Ile Glu Leu Asp Tyr Ala Val Gln Lys Glu
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Pro Ala Gly Ile Ala Asp Ala Leu Leu Val Gly Ala Glu His Ile Gly
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Asp Asp Thr Cys Ala Leu Ile Leu Gly Asp Asn Ile Phe His Gly Pro
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Gly Leu Tyr Thr Leu Leu Arg Asp Ser Ile Ala Arg Leu Asp Gly Cys
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Val Leu Phe Gly Tyr Pro Val Lys Asp Pro Glu Arg Tyr Gly Val Ala
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Glu Val Asp Ala Thr Gly Arg Leu Thr Asp Leu Val Glu Lys Pro Val
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Lys Pro Arg Ser Asn Leu Ala Val Thr Gly Leu Tyr Leu Tyr Asp Asn
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Asp Val Val Asp Ile Ala Lys Asn Ile Arg Pro Ser Pro Arg Gly Glu
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Leu Glu Ile Thr Asp Val Asn Arg Val Tyr Leu Glu Arg Gly Arg Ala
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Glu Leu Val Asn Leu Gly Arg Gly Phe Ala Trp Leu Asp Thr Gly Thr
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His Asp Ser Leu Leu Arg Ala Ala Gln Tyr Val Gln Val Leu Glu Glu
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Arg Gln Gly Val Trp Ile Ala Gly Leu Glu Glu Ile Ala Phe Arg Met
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Gln Thr Leu Ala Ala Gly Gly Leu Val Pro Pro Asp Glu Ala Gly Thr
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Leu Pro Leu Glu Gln Arg Gly Val Phe Asp Ala Ala Leu Ala Arg Lys
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Pro Val Phe Pro Tyr Ser Val Gly Leu Tyr Pro Gly Pro Thr Cys Met
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Phe Arg Cys His Phe Cys Val Arg Val Thr Gly Ala Arg Tyr Asp Pro
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Ser Ala Leu Asp Ala Gly Asn Ala Met Phe Arg Ser Val Ile Asp Glu
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Ile Pro Ala Gly Asn Pro Ser Ala Met Tyr Phe Ser Gly Gly Leu Glu
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Pro Leu Thr Asn Pro Gly Leu Gly Ser Leu Ala Ala His Ala Thr Asp
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His Gly Leu Arg Pro Thr Val Tyr Thr Asn Ser Phe Ala Leu Thr Glu
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Arg Thr Leu Glu Arg Gln Pro Gly Leu Trp Gly Leu His Ala Ile Arg
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Thr Ser Leu Tyr Gly Leu Asn Asp Glu Glu Tyr Glu Gln Thr Thr Gly
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Lys Lys Ala Ala Phe Arg Arg Val Arg Glu Asn Leu Arg Arg Phe Gln
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Gln Leu Arg Ala Glu Arg Glu Ser Pro Ile Asn Leu Gly Phe Ala Tyr
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Ile Val Leu Pro Gly Arg Ala Ser Arg Leu Leu Asp Leu Val Asp Phe
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Ile Ala Asp Leu Asn Asp Ala Gly Gln Gly Arg Thr Ile Asp Phe Val
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Asn Ile Arg Glu Asp Tyr Ser Gly Arg Asp Asp Gly Lys Leu Pro Gln
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Glu Glu Arg Ala Glu Leu Gln Glu Ala Leu Asn Ala Phe Glu Glu Arg
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Val Arg Glu Arg Thr Pro Gly Leu His Ile Asp Tyr Gly Tyr Ala Leu
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Asn Ser Leu Arg Thr Gly Ala Asp Ala Glu Leu Leu Arg Ile Lys Pro
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Ala Thr Met Arg Pro Thr Ala His Pro Gln Val Ala Val Gln Val Asp
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Leu Leu Gly Asp Val Tyr Leu Tyr Arg Glu Ala Gly Phe Pro Asp Leu
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Asp Gly Ala Thr Arg Tyr Ile Ala Gly Arg Val Thr Pro Asp Thr Ser
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Leu Thr Glu Val Val Arg Asp Phe Val Glu Arg Gly Gly Glu Val Ala
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Ala Val Asp Gly Asp Glu Tyr Phe Met Asp Gly Phe Asp Gln Val Val
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Glu Ala Arg Gly Phe Leu Arg Met Lys Ser Ala Leu Ser Asp Leu Ala
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Phe Phe Gly Gly Pro Ala Ala Phe Asp Gln Pro Leu Leu Val Gly Arg
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Pro Asn Arg Ile Asp Arg Ala Arg Leu Tyr Glu Arg Leu Asp Arg Ala
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Leu Asp Ser Gln Trp Leu Ser Asn Gly Gly Pro Leu Val Arg Glu Phe
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Arg Thr Ser Ala Val Val Gly Val His Leu Trp Gly Arg Pro Cys Ala
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Ala Asp Gln Leu Arg Lys Val Ala Asp Glu His Gly Leu Arg Leu Tyr
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Phe Asp Ala Ala His Ala Leu Gly Cys Ala Val Asp Gly Arg Pro Ala
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Gly Ser Leu Gly Asp Ala Glu Val Phe Ser Phe His Ala Thr Lys Ala
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Val Asn Ala Phe Glu Gly Gly Ala Val Val Thr Asp Asp Ala Asp Leu
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Gly Ser Pro Ala Gly Gly Thr Asn Ala Lys Met Ser Glu Ala Ala Ala
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Ala Met Gly Leu Thr Ser Leu Asp Ala Phe Pro Glu Val Ile Asp Arg
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Asn Arg Arg Asn His Ala Ala Tyr Arg Glu His Leu Ala Asp Leu Pro
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Gly Val Leu Val Ala Asp His Asp Arg His Gly Leu Asn Asn His Gln
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Tyr Val Ile Val Glu Ile Asp Glu Ala Thr Thr Gly Ile His Arg Asp
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Leu Val Met Glu Val Leu Lys Ala Glu Gly Val His Thr Arg Ala Tyr
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Phe Ser Pro Gly Cys His Glu Leu Glu Pro Tyr Arg Gly Gln Pro His
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Ala Pro Leu Pro His Thr Glu Arg Leu Ala Ala Arg Val Leu Ser Leu
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Pro Thr Gly Thr Ala Ile Gly Asp Asp Asp Ile Arg Arg Val Ala Asp
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Leu Leu Arg Leu Cys Ala Thr Arg Gly Arg Glu Leu Thr Ala Arg His
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27

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35

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<212> PRT
<213> Streptomyces venezuelae

<400> 6

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             20                  25                  30
Thr Lys Gly Pro Ile Leu Glu Ile Gly Pro Gly Asp Gly Ala Leu Thr
         35                  40                  45
Leu Pro Leu Ser Arg His Gly Arg Pro Ile Thr Ala Val Glu Leu Asp
     50                  55                  60
Gly Arg Arg Ala Gln Arg Leu Gly Ala Arg Thr Pro Gly His Val Thr
65                  70                  75                  80
Val Val His His Asp Phe Leu Gln Tyr Pro Leu Pro Arg Asn Pro His
                 85                  90                  95
Val Val Val Gly Asn Val Pro Phe His Leu Thr Thr Ala Ile Met Arg
            100                 105                 110
Arg Leu Leu Asp Ala Gln His Trp His Thr Ala Val Leu Leu Val Gln
        115                 120                 125
Trp Glu Val Ala Arg Arg Arg Ala Gly Val Gly Gly Ser Thr Leu Leu
    130                 135                 140
Thr Ala Gly Trp Ala Pro Trp Tyr Glu Phe Asp Leu His Ser Arg Val
145                 150                 155                 160
Pro Ala Arg Ala Phe Arg Pro Met Pro Gly Val Asp Gly Gly Val Leu
                165                 170                 175
Ala Ile Arg Arg Arg Ser Ala Pro Leu Val Gly Gln Val Lys Thr Tyr
            180                 185                 190
Gln Asp Phe Val Arg Gln Val Phe Thr Gly Lys Gly Asn Gly Leu Lys
        195                 200                 205
Glu Ile Leu Arg Arg Thr Gly Arg Ile Ser Gln Arg Asp Leu Ala Thr
    210                 215                 220
Trp Leu Arg Arg Asn Glu Ile Ser Pro His Ala Leu Pro Lys Asp Leu
225                 230                 235                 240
Lys Pro Gly Gln Trp Ala Ser Leu Trp Glu Leu Thr Gly Gly Thr Ala
                245                 250                 255
Asp Gly Ser Phe Asp Gly Thr Ala Gly Gly Ala Ala Gly Ser His
                260                 265                 270
Gly Ala Ala Arg Val Gly Ala Gly His Pro Gly Gly Arg Val Ser Ala
        275                 280                 285
Ser Arg Arg Gly Val Pro Gln Ala Arg Arg Gly Arg Gly His Ala Val
    290                 295                 300
Arg Ser Ser Thr Gly Thr Glu Pro Arg Trp Gly Arg Gly Arg Ala Glu
305                 310                 315                 320
Ser Ala Met Ala Met Arg Asp Ser Ile Pro Arg Arg Ala Asp Arg Asp
                325                 330                 335
Thr Leu Arg Arg Glu Leu Gly Gln Asn Phe Leu Gln Asp Asp Arg Ala
            340                 345                 350
Val Arg Asn Leu Val Thr His Val Glu Gly Asp Gly Arg Asn Val Leu
        355                 360                 365
Glu Ile Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser
    370                 375                 380
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Phe Asp Thr Val Thr Val Val Glu Met Asp Pro His Trp Ala Ala His
385                 390                 395                 400
Val Arg Arg Lys Phe Glu Gly Glu Arg Val Thr Val Phe Gln Gly Asp
            405             410             415
Phe Leu Asp Phe Arg Ile Pro Arg Asp Ile Asp Thr Val Val Gly Asn
        420             425             430
Val Pro Phe Gly Ile Thr Thr Gln Ile Leu Arg Ser Leu Leu Glu Ser
        435             440             445
Thr Asn Trp Gln Ser Ala Ala Leu Ile Val Gln Trp Glu Val Ala Arg
    450             455             460
Lys Arg Ala Gly Arg Ser Gly Gly Ser Leu Leu Thr Thr Ser Trp Ala
465             470             475             480
Pro Trp Tyr Glu Phe Ala Val His Asp Arg Val Arg Ala Ser Ser Phe
            485             490             495
Arg Pro Met Pro Arg Val Asp Gly Gly Val Leu Thr Ile Arg Arg Arg
        500             505             510
Pro Gln Pro Leu Leu Pro Glu Ser Ala Ser Arg Ala Phe Gln Asn Phe
        515             520             525
Ala Glu Ala Val Phe Thr Gly Pro Gly Arg Gly Leu Ala Glu Ile Leu
    530             535             540
Arg Arg His Ile Pro Lys Arg Thr Tyr Arg Ser Leu Ala Asp Arg His
545             550             555             560
Gly Ile Pro Asp Gly Gly Leu Pro Lys Asp Leu Thr Leu Thr Gln Trp
            565             570             575
Ile Ala Leu Phe Gln Ala Ser Gln Pro Ser Tyr Ala Pro Gly Ala Pro
        580             585             590
Gly Thr Arg Met Pro Gly Gln Gly Gly Gly Ala Gly Gly Arg Asp Tyr
        595             600             605
Asp Ser Glu Thr Ser Arg Ala Ala Val Pro Gly Ser Arg Arg Tyr Gly
    610             615             620
Pro Thr Arg Gly Gly Glu Pro Cys Ala Pro Arg Ala Gln Val Arg Gln
625             630             635             640
Thr Lys Gly Arg Gln Gly Ala Arg Gly Ser Ser Tyr Gly Arg Arg Thr
            645             650             655
Gly Arg Met Ser Ser Ala Gly Ile Thr Arg Thr Gly Ala Arg Thr Pro
        660             665             670
Val Thr Gly Arg Gly Ala Ala Ala Trp Asp Thr Gly Glu Val Arg Val
        675             680             685
Arg Arg Gly Leu Pro Pro Ala Gly Pro Asp His Ala Glu His Ser Phe
    690             695             700
Ser Arg Ala Pro Thr Gly Asp Val Arg Ala Glu Leu Ile Arg Gly Glu
705             710             715             720
Met Ser Thr Val Ser Lys Ser Glu Ser Glu Glu Phe Val Ser Val Ser
            725             730             735
Asn Asp Ala Gly Ser Ala His Gly Thr Ala Glu Pro Val Ala Val Val
            740             745             750
Gly Ile Ser Cys Arg Val Pro Gly Ala Arg Asp Pro Arg Glu Phe Trp
        755             760             765
Glu Leu Leu Ala Ala Gly Gly Gln Ala Val Thr Asp Val Pro Ala Asp
    770             775             780
Arg Trp Asn Ala Gly Asp Phe Tyr Asp Pro Asp Arg Ser Ala Pro Gly
785             790             795             800
Arg Ser Asn Ser Arg Trp Gly Gly Phe Ile Glu Asp Val Asp Arg Phe
            805             810             815
Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Ala Glu Met Asp
        820             825             830
Pro Gln Gln Arg Leu Ala Leu Glu Leu Gly Trp Glu Ala Leu Glu Arg
        835             840             845
Ala Gly Ile Asp Pro Ser Ser Leu Thr Gly Thr Arg Thr Gly Val Phe
    850             855             860
Ala Gly Ala Ile Trp Asp Asp Tyr Ala Thr Leu Lys His Arg Gln Gly
865             870             875             880
```

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Gly Ala Ala Ile Thr Pro His Thr Val Thr Gly Leu His Arg Gly Ile
                885   890   895
Ile Ala Asn Arg Leu Ser Tyr Thr Leu Gly Leu Arg Gly Pro Ser Met
            900   905   910
Val Val Asp Ser Gly Gln Ser Ser Ser Leu Val Ala Val His Leu Ala
            915   920   925
Cys Glu Ser Leu Arg Arg Gly Glu Ser Glu Leu Ala Leu Ala Gly Gly
    930   935   940
Val Ser Leu Asn Leu Val Pro Asp Ser Ile Ile Gly Ala Ser Lys Phe
945   950   955   960
Gly Gly Leu Ser Pro Asp Gly Arg Ala Tyr Thr Phe Asp Ala Arg Ala
            965   970   975
Asn Gly Tyr Val Arg Gly Glu Gly Gly Phe Val Val Leu Lys Arg
            980   985   990
Leu Ser Arg Ala Val Ala Asp Gly Asp Pro Val Leu Ala Val Ile Arg
    995   1000   1005
Gly Ser Ala Val Asn Asn Gly Gly Ala Ala Gln Gly Met Thr Thr Pro
    1010   1015   1020
Asp Ala Gln Ala Gln Glu Ala Val Leu Arg Glu Ala His Glu Arg Ala
1025   1030   1035   1040
Gly Thr Ala Pro Ala Asp Val Arg Tyr Val Glu Leu His Gly Thr Gly
            1045   1050   1055
Thr Pro Val Gly Asp Pro Ile Glu Ala Ala Ala Leu Gly Ala Ala Leu
            1060   1065   1070
Gly Thr Gly Arg Pro Ala Gly Gln Pro Leu Leu Val Gly Ser Val Lys
            1075   1080   1085
Thr Asn Ile Gly His Leu Glu Gly Ala Ala Gly Ile Ala Gly Leu Ile
            1090   1095   1100
Lys Ala Val Leu Ala Val Arg Gly Arg Ala Leu Pro Ala Ser Leu Asn
1105   1110   1115   1120
Tyr Glu Thr Pro Asn Pro Ala Ile Pro Phe Glu Glu Leu Asn Leu Arg
            1125   1130   1135
Val Asn Thr Glu Tyr Leu Pro Trp Glu Pro Glu His Asp Gly Gln Arg
            1140   1145   1150
Met Val Val Gly Val Ser Ser Phe Gly Met Gly Gly Thr Asn Ala His
            1155   1160   1165
Val Val Leu Glu Glu Ala Pro Gly Gly Cys Arg Gly Ala Ser Val Val
            1170   1175   1180
Glu Ser Thr Val Gly Gly Ser Ala Val Gly Gly Gly Val Val Pro Trp
1185   1190   1195   1200
Val Val Ser Ala Lys Ser Ala Ala Ala Leu Asp Ala Gln Ile Glu Arg
            1205   1210   1215
Leu Ala Ala Phe Ala Ser Arg Asp Arg Thr Asp Gly Val Asp Ala Gly
            1220   1225   1230
Ala Val Asp Ala Gly Ala Val Asp Ala Gly Ala Val Ala Arg Val Leu
            1235   1240   1245
Ala Gly Gly Arg Ala Gln Phe Glu His Arg Ala Val Val Val Gly Ser
    1250   1255   1260
Gly Pro Asp Asp Leu Ala Ala Ala Leu Ala Ala Pro Glu Gly Leu Val
1265   1270   1275   1280
Arg Gly Val Ala Ser Gly Val Gly Arg Val Ala Phe Val Phe Pro Gly
            1285   1290   1295
Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp Ser Ser
            1300   1305   1310
Ala Val Phe Ala Ala Ala Met Ala Glu Cys Glu Ala Ala Leu Ser Pro
    1315   1320   1325
Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala
    1330   1335   1340
Pro Thr Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val
1345   1350   1355   1360
Met Val Ser Leu Ala Arg Val Trp Gln His His Gly Val Thr Pro Gln
            1365   1370   1375

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Gly Ala Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser
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Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Leu Ser Leu
    1410                    1415                    1420
Ala Leu Ser Glu Asp Ala Val Leu Glu Arg Leu Ala Gly Phe Asp Gly
1425                    1430                    1435                    1440
Leu Ser Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly
                1445                    1450                    1455
Asp Pro Val Gln Ile Glu Glu Leu Ala Arg Ala Cys Glu Ala Asp Gly
                1460                    1465                    1470
Val Arg Ala Arg Val Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln
    1475                    1480                    1485
Val Glu Ile Ile Glu Ser Glu Leu Ala Glu Val Leu Ala Gly Leu Ser
    1490                    1495                    1500
Pro Gln Ala Pro Arg Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp
1505                    1510                    1515                    1520
Ile Thr Glu Pro Val Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg
                1525                    1530                    1535
His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu
        1540                    1545                    1550
Gly Phe Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met
        1555                    1560                    1565
Ala Leu Pro Gly Thr Val Thr Gly Leu Ala Thr Leu Arg Arg Asp Asn
    1570                    1575                    1580
Gly Gly Gln Asp Arg Leu Val Ala Ser Leu Ala Glu Ala Trp Ala Asn
1585                    1590                    1595                    1600
Gly Leu Ala Val Asp Trp Ser Pro Leu Leu Pro Ser Ala Thr Gly His
            1605                    1610                    1615
His Ser Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg His Trp Leu
        1620                    1625                    1630
Gly Glu Ile Glu Ala Leu Ala Pro Ala Gly Glu Pro Ala Val Gln Pro
        1635                    1640                    1645
Ala Val Leu Arg Thr Glu Ala Ala Glu Pro Ala Glu Leu Asp Arg Asp
    1650                    1655                    1660
Glu Gln Leu Arg Val Ile Leu Asp Lys Val Arg Ala Gln Thr Ala Gln
1665                    1670                    1675                    1680
Val Leu Gly Tyr Ala Thr Gly Gly Gln Ile Glu Val Asp Arg Thr Phe
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Arg Glu Ala Gly Cys Thr Ser Leu Thr Gly Val Asp Leu Arg Asn Arg
        1700                    1705                    1710
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    1715                    1720                    1725
Phe Pro Thr Pro Glu Ala Leu Ala Glu Gln Leu Leu Leu Val Val His
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Gly Glu Ala Ala Ala Asn Pro Ala Gly Ala Glu Pro Ala Pro Val Ala
1745                    1750                    1755                    1760
Ala Ala Gly Ala Val Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys
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Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val
        1780                    1785                    1790
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        1795                    1800                    1805
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Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln
            1845                    1850                    1855
Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly
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Ala Met Thr His Glu Tyr Gly Pro Ser Leu Arg Asp Gly Gly Glu Gly
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Leu Asp Gly Tyr Leu Leu Thr Gly Asn Thr Ala Ser Val Met Ser Gly
1905                1910                1915                1920
Arg Val Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala Leu Thr Val Asp
                1925                1930                1935
Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala
            1940                1945                1950
Leu Arg Lys Gly Glu Val Asp Met Ala Leu Ala Gly Gly Val Ala Val
        1955                1960                1965
Met Pro Thr Pro Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu
    1970                1975                1980
Ala Gly Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser Ala Asp Gly Thr
1985                1990                1995                2000
Ser Trp Ser Glu Gly Val Gly Val Leu Leu Val Glu Arg Leu Ser Asp
                2005                2010                2015
Ala Arg Arg Asn Gly His Gln Val Leu Ala Val Val Arg Gly Ser Ala
            2020                2025                2030
Leu Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro
    2035                2040                2045
Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Thr
    2050                2055                2060
Thr Ser Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu
2065                2070                2075                2080
Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly
            2085                2090                2095
Arg Asp Asp Glu Gln Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Ile
            2100                2105                2110
Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Val Ile Lys Met Val
    2115                2120                2125
Gln Ala Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu
    2130                2135                2140
Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Ala Val Glu Leu Leu Thr
2145                2150                2155                2160
Glu Ala Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala
            2165                2170                2175
Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu
            2180                2185                2190
Glu Glu Ala Pro Val Val Val Glu Gly Ala Ser Val Val Glu Pro Ser
    2195                2200                2205
Val Gly Gly Ser Ala Val Gly Gly Gly Val Thr Pro Trp Val Val Ser
    2210                2215                2220
Ala Lys Ser Ala Ala Ala Leu Asp Ala Gln Ile Glu Arg Leu Ala Ala
2225                2230                2235                2240
Phe Ala Ser Arg Asp Arg Thr Asp Asp Ala Asp Ala Gly Ala Val Asp
                2245                2250                2255
Ala Gly Ala Val Ala His Val Leu Ala Asp Gly Arg Ala Gln Phe Glu
            2260                2265                2270
His Arg Ala Val Ala Leu Gly Ala Gly Ala Asp Asp Leu Val Gln Ala
        2275                2280                2285
Leu Ala Asp Pro Asp Gly Leu Ile Arg Gly Thr Ala Ser Gly Val Gly
    2290                2295                2300
Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met
2305                2310                2315                2320
Gly Ala Glu Leu Leu Asp Ser Ser Ala Val Phe Ala Ala Ala Met Ala
            2325                2330                2335
Glu Cys Glu Ala Ala Leu Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala
        2340                2345                2350
Val Val Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp Val
    2355                2360                2365
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Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Arg Val Trp
    2370             2375                 2380
Gln His His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln Gly
2385                 2390                 2395                 2400
Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Pro Leu Asp Asp Ala
            2405                 2410                 2415
Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala
            2420                 2425                 2430
Gly Lys Gly Gly Met Leu Ser Leu Ala Leu Asn Glu Asp Ala Val Leu
            2435                 2440                 2445
Glu Arg Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala Val Asn Gly
    2450                 2455                 2460
Pro Thr Ala Thr Val Val Ser Gly Asp Pro Val Gln Ile Glu Glu Leu
2465                 2470                 2475                 2480
Ala Gln Ala Cys Lys Ala Asp Gly Phe Arg Ala Arg Ile Ile Pro Val
            2485                 2490                 2495
Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu Ser Glu Leu
            2500                 2505                 2510
Ala Gln Val Leu Ala Gly Leu Ser Pro Gln Ala Pro Arg Val Pro Phe
            2515                 2520                 2525
Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val Leu Asp Gly
    2530                 2535                 2540
Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala
2545                 2550                 2555                 2560
Ile Glu Thr Leu Ala Val Asp Glu Gly Phe Thr His Phe Val Glu Val
            2565                 2570                 2575
Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly
            2580                 2585                 2590
Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr
    2595                 2600                 2605
Ser Leu Ala Glu Ala Trp Val Asn Gly Leu Pro Val Ala Trp Thr Ser
    2610                 2615                 2620
Leu Leu Pro Ala Thr Ala Ser Arg Pro Gly Leu Pro Thr Tyr Ala Phe
2625                 2630                 2635                 2640
Gln Ala Glu Arg Tyr Trp Leu Glu Asn Thr Pro Ala Ala Leu Ala Thr
            2645                 2650                 2655
Gly Asp Asp Trp Arg Tyr Arg Ile Asp Trp Lys Arg Leu Pro Ala Ala
            2660                 2665                 2670
Glu Gly Ser Glu Arg Thr Gly Leu Ser Gly Arg Trp Leu Ala Val Thr
            2675                 2680                 2685
Pro Glu Asp His Ser Ala Gln Ala Ala Ala Val Leu Thr Ala Leu Val
    2690                 2695                 2700
Asp Ala Gly Ala Lys Val Glu Val Leu Thr Ala Gly Ala Asp Asp Asp
2705                 2710                 2715                 2720
Arg Glu Ala Leu Ala Ala Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly
            2725                 2730                 2735
Phe Thr Gly Val Val Ser Leu Leu Asp Gly Leu Val Pro Gln Val Ala
            2740                 2745                 2750
Trp Val Gln Ala Leu Gly Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser
    2755                 2760                 2765
Val Thr Gln Gly Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp
    2770                 2775                 2780
Pro Asp Arg Ala Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu
2785                 2790                 2795                 2800
His Pro Glu Arg Trp Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp
            2805                 2810                 2815
Ala Ala Ala Leu Ala His Leu Val Thr Ala Leu Ser Gly Ala Thr Gly
            2820                 2825                 2830
Glu Asp Gln Ile Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu
            2835                 2840                 2845
Ala Arg Ala Pro Leu His Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro
    2850                 2855                 2860
```

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```
His Gly Thr Val Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His
2865                2870                2875                    2880
Ala Ala Arg Trp Met Ala His His Gly Ala Glu His Leu Leu Leu Val
            2885                2890                2895
Ser Arg Ser Gly Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu
            2900                2905                2910
Leu Thr Ala Ser Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala
            2915                2920                2925
Asp Pro His Ala Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr
2930                2935                2940
Pro Leu Thr Ala Val Val His Thr Ala Gly Ala Leu Asp Asp Gly Ile
2945                2950                2955                    2960
Val Asp Thr Leu Thr Ala Glu Gln Val Arg Arg Ala His Arg Ala Lys
            2965                2970                2975
Ala Val Gly Ala Ser Val Leu Asp Glu Leu Thr Arg Asp Leu Asp Leu
            2980                2985                2990
Asp Ala Phe Val Leu Phe Ser Ser Val Ser Thr Leu Gly Ile Pro
            2995                3000                3005
Gly Gln Gly Asn Tyr Ala Pro His Asn Ala Tyr Leu Asp Ala Leu Ala
        3010                3015                3020
Ala Arg Arg Arg Ala Thr Gly Arg Ser Ala Val Ser Val Ala Trp Gly
3025                3030                3035                    3040
Pro Trp Asp Gly Gly Gly Met Ala Ala Gly Asp Gly Val Ala Glu Arg
            3045                3050                3055
Leu Arg Asn His Gly Val Pro Gly Met Asp Pro Glu Leu Ala Leu Ala
            3060                3065                3070
Ala Leu Glu Ser Ala Leu Gly Arg Asp Glu Thr Ala Ile Thr Val Ala
            3075                3080                3085
Asp Ile Asp Trp Asp Arg Phe Tyr Leu Ala Tyr Ser Ser Gly Arg Pro
        3090                3095                3100
Gln Pro Leu Val Glu Glu Leu Pro Glu Val Arg Arg Ile Ile Asp Ala
3105                3110                3115                    3120
Arg Asp Ser Ala Thr Ser Gly Gln Gly Gly Ser Ser Ala Gln Gly Ala
            3125                3130                3135
Asn Pro Leu Ala Glu Arg Leu Ala Ala Ala Ala Pro Gly Glu Arg Thr
            3140                3145                3150
Glu Ile Leu Leu Gly Leu Val Arg Ala Gln Ala Ala Ala Val Leu Arg
            3155                3160                3165
Met Arg Ser Pro Glu Asp Val Ala Ala Asp Arg Ala Phe Lys Asp Ile
3170                3175                3180
Gly Phe Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu Thr Arg
3185                3190                3195                    3200
Ala Thr Gly Leu Gln Leu Pro Ala Thr Leu Val Phe Asp His Pro Thr
            3205                3210                3215
Pro Leu Ala Leu Val Ser Leu Leu Arg Ser Glu Phe Leu Gly Asp Glu
            3220                3225                3230
Glu Thr Ala Asp Ala Arg Arg Ser Ala Ala Leu Pro Ala Thr Val Gly
            3235                3240                3245
Ala Gly Ala Gly Ala Gly Ala Gly Thr Asp Ala Asp Asp Asp Pro Ile
3250                3255                3260
Ala Ile Val Ala Met Ser Cys Arg Tyr Pro Gly Asp Ile Arg Ser Pro
3265                3270                3275                    3280
Glu Asp Leu Trp Arg Met Leu Ser Glu Gly Gly Glu Gly Ile Thr Pro
            3285                3290                3295
Phe Pro Thr Asp Arg Gly Trp Asp Leu Asp Gly Leu Tyr Asp Ala Asp
        3300                3305                3310
Pro Asp Ala Leu Gly Arg Ala Tyr Val Arg Glu Gly Gly Phe Leu His
        3315                3320                3325
Asp Ala Ala Glu Phe Asp Ala Glu Phe Phe Gly Val Ser Pro Arg Glu
        3330                3335                3340
Ala Leu Ala Met Asp Pro Gln Gln Arg Met Leu Leu Thr Thr Ser Trp
3345                3350                3355                    3360
```

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```
Glu Ala Phe Glu Arg Ala Gly Ile Glu Pro Ala Ser Leu Arg Gly Ser
          3365                    3370                    3375
Ser Thr Gly Val Phe Ile Gly Leu Ser Tyr Gln Asp Tyr Ala Ala Arg
          3380                    3385                    3390
Val Pro Asn Ala Pro Arg Gly Val Glu Gly Tyr Leu Leu Thr Gly Ser
          3395                    3400                    3405
Thr Pro Ser Val Ala Ser Gly Arg Ile Ala Tyr Thr Phe Gly Leu Glu
          3410                    3415                    3420
Gly Pro Ala Thr Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Thr Ala
3425                    3430                    3435                    3440
Leu His Leu Ala Val Arg Ala Leu Arg Ser Gly Glu Cys Thr Met Ala
          3445                    3450                    3455
Leu Ala Gly Gly Val Ala Met Met Ala Thr Pro His Met Phe Val Glu
          3460                    3465                    3470
Phe Ser Arg Gln Arg Ala Leu Ala Pro Asp Gly Arg Ser Lys Ala Phe
          3475                    3480                    3485
Ser Ala Asp Ala Asp Gly Phe Gly Ala Ala Glu Gly Val Gly Leu Leu
          3490                    3495                    3500
Leu Val Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His Pro Val Leu
3505                    3510                    3515                    3520
Ala Val Val Arg Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Asn Gly
          3525                    3530                    3535
Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala
          3540                    3545                    3550
Leu Ala Asp Ala Arg Leu Ala Pro Gly Asp Ile Asp Ala Val Glu Thr
          3555                    3560                    3565
His Gly Thr Gly Thr Ser Leu Gly Asp Pro Ile Glu Ala Gln Gly Leu
          3570                    3575                    3580
Gln Ala Thr Tyr Gly Lys Glu Arg Pro Ala Glu Arg Pro Leu Ala Ile
3585                    3590                    3595                    3600
Gly Ser Val Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Ala
          3605                    3610                    3615
Ala Gly Ile Ile Lys Met Val Leu Ala Met Arg His Gly Thr Leu Pro
          3620                    3625                    3630
Lys Thr Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Ala Asn
          3635                    3640                    3645
Ser Gly Leu Ala Leu Val Thr Glu Pro Ile Asp Trp Pro Ala Gly Thr
          3650                    3655                    3660
Gly Pro Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn
3665                    3670                    3675                    3680
Ala His Val Val Leu Glu Gln Ala Pro Asp Ala Ala Gly Glu Val Leu
          3685                    3690                    3695
Gly Ala Asp Glu Val Pro Glu Val Ser Glu Thr Val Ala Met Ala Gly
          3700                    3705                    3710
Thr Ala Gly Thr Ser Glu Val Ala Glu Gly Ser Glu Ala Ser Glu Ala
          3715                    3720                    3725
Pro Ala Ala Pro Gly Ser Arg Glu Ala Ser Leu Pro Gly His Leu Pro
          3730                    3735                    3740
Trp Val Leu Ser Ala Lys Asp Glu Gln Ser Leu Arg Gly Gln Ala Ala
3745                    .3750                    3755                    3760
Ala Leu His Ala Trp Leu Ser Glu Pro Ala Ala Asp Leu Ser Asp Ala
          3765                    3770                    3775
Asp Gly Pro Ala Arg Leu Arg Asp Val Gly Tyr Thr Leu Ala Thr Ser
          3780                    3785                    3790
Arg Thr Ala Phe Ala His Arg Ala Ala Val Thr Ala Ala Asp Arg Asp
          3795                    3800                    3805
Gly Phe Leu Asp Gly Leu Ala Thr Leu Ala Gln Gly Gly Thr Ser Ala
          3810                    3815                    3820
His Val His Leu Asp Thr Ala Arg Asp Gly Thr Thr Ala Phe Leu Phe
3825                    3830                    3835                    3840
Thr Gly Gln Gly Ser Gln Arg Pro Gly Ala Gly Arg Glu Leu Tyr Asp
          3845                    3850                    3855
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                                    44

```
Arg His Pro Val Phe Ala Arg Ala Leu Asp Glu Ile Cys Ala His Leu
        3860                3865                3870
Asp Gly His Leu Glu Leu Pro Leu Leu Asp Val Met Phe Ala Ala Glu
        3875                3880                3885
Gly Ser Ala Glu Ala Ala Leu Leu Asp Glu Thr Arg Tyr Thr Gln Cys
        3890                3895                3900
Ala Leu Phe Ala Leu Glu Val Ala Leu Phe Arg Leu Val Glu Ser Trp
3905                3910                3915                3920
Gly Met Arg Pro Ala Ala Leu Leu Gly His Ser Val Gly Glu Ile Ala
                3925                3930                3935
Ala Ala His Val Ala Gly Val Phe Ser Leu Ala Asp Ala Ala Arg Leu
        3940                3945                3950
Val Ala Ala Arg Gly Arg Leu Met Gln Glu Leu Pro Ala Gly Gly Ala
        3955                3960                3965
Met Leu Ala Val Gln Ala Ala Glu Asp Glu Ile Arg Val Trp Leu Glu
        3970                3975                3980
Thr Glu Glu Arg Tyr Ala Gly Arg Leu Asp Val Ala Ala Val Asn Gly
3985                3990                3995                4000
Pro Glu Ala Ala Val Leu Ser Gly Asp Ala Asp Ala Ala Arg Glu Ala
                4005                4010                4015
Glu Ala Tyr Trp Ser Gly Leu Gly Arg Arg Thr Arg Ala Leu Arg Val
                4020                4025                4030
Ser His Ala Phe His Ser Ala His Met Asp Gly Met Leu Asp Gly Phe
        4035                4040                4045
Arg Ala Val Leu Glu Thr Val Glu Phe Arg Arg Pro Ser Leu Thr Val
        4050                4055                4060
Val Ser Asn Val Thr Gly Leu Ala Ala Gly Pro Asp Asp Leu Cys Asp
4065                4070                4075                4080
Pro Glu Tyr Trp Val Arg His Val Arg Gly Thr Val Arg Phe Leu Asp
                4085                4090                4095
Gly Val Arg Val Leu Arg Asp Leu Gly Val Arg Thr Cys Leu Glu Leu
                4100                4105                4110
Gly Pro Asp Gly Val Leu Thr Ala Met Ala Ala Asp Gly Leu Ala Asp
        4115                4120                4125
Thr Pro Ala Asp Ser Ala Ala Gly Ser Pro Val Gly Ser Pro Ala Gly
        4130                4135                4140
Ser Pro Ala Asp Ser Ala Ala Gly Ala Leu Arg Pro Arg Pro Leu Leu
4145                4150                4155                4160
Val Ala Leu Leu Arg Arg Lys Arg Ser Glu Thr Glu Thr Val Ala Asp
                4165                4170                4175
Ala Leu Gly Arg Ala His Ala His Gly Thr Gly Pro Asp Trp His Ala
        4180                4185                4190
Trp Phe Ala Gly Ser Gly Ala His Arg Val Asp Leu Pro Thr Tyr Ser
        4195                4200                4205
Phe Arg Arg Asp Arg Tyr Trp Leu Asp Ala Pro Ala Ala Asp Thr Ala
        4210                4215                4220
Val Asp Thr Ala Gly Leu Gly Leu Gly Thr Ala Asp His Pro Leu Leu
4225                4230                4235                4240
Gly Ala Val Val Ser Leu Pro Asp Arg Asp Gly Leu Leu Leu Thr Gly
                4245                4250                4255
Arg Leu Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Leu
        4260                4265                4270
Gly Ser Val Leu Leu Pro Gly Ala Ala Met Val Glu Leu Ala Ala His
        4275                4280                4285
Ala Ala Glu Ser Ala Gly Leu Arg Asp Val Arg Glu Leu Thr Leu Leu
        4290                4295                4300
Glu Pro Leu Val Leu Pro Glu His Gly Gly Val Glu Leu Arg Val Thr
4305                4310                4315                4320
Val Gly Ala Pro Ala Gly Glu Pro Gly Gly Glu Ser Ala Gly Asp Gly
                4325                4330                4335
Ala Arg Pro Val Ser Leu His Ser Arg Leu Ala Asp Ala Pro Ala Gly
        4340                4345                4350
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```
Thr Ala Trp Ser Cys His Ala Thr Gly Leu Leu Ala Thr Asp Arg Pro
        4355                4360                4365
Glu Leu Pro Val Ala Pro Asp Arg Ala Ala Met Trp Pro Pro Gln Gly
    4370                4375                4380
Ala Glu Glu Val Pro Leu Asp Gly Leu Tyr Glu Arg Leu Asp Gly Asn
4385                4390                4395                4400
Gly Leu Ala Phe Gly Pro Leu Phe Gln Gly Leu Asn Ala Val Trp Arg
        4405                4410                4415
Tyr Glu Gly Glu Val Phe Ala Asp Ile Ala Leu Pro Ala Thr Thr Asn
        4420                4425                4430
Ala Thr Ala Pro Ala Thr Ala Asn Gly Gly Gly Ser Ala Ala Ala Ala
        4435                4440                4445
Pro Tyr Gly Ile His Pro Ala Leu Leu Asp Ala Ser Leu His Ala Ile
    4450                4455                4460
Ala Val Gly Gly Leu Val Asp Glu Pro Glu Leu Val Arg Val Pro Phe
4465                4470                4475                4480
His Trp Ser Gly Val Thr Val His Ala Ala Gly Ala Ala Ala Ala Arg
        4485                4490                4495
Val Arg Leu Ala Ser Ala Gly Thr Asp Ala Val Ser Leu Ser Leu Thr
        4500                4505                4510
Asp Gly Glu Gly Arg Pro Leu Val Ser Val Glu Arg Leu Thr Leu Arg
        4515                4520                4525
Pro Val Thr Ala Asp Gln Ala Ala Ala Ser Arg Val Gly Gly Leu Met
    4530                4535                4540
His Arg Val Ala Trp Arg Pro Tyr Ala Leu Ala Ser Ser Gly Glu Gln
4545                4550                4555                4560
Asp Pro His Ala Thr Ser Tyr Gly Pro Thr Ala Val Leu Gly Lys Asp
        4565                4570                4575
Glu Leu Lys Val Ala Ala Ala Leu Glu Ser Ala Gly Val Glu Val Gly
        4580                4585                4590
Leu Tyr Pro Asp Leu Ala Ala Leu Ser Gln Asp Val Ala Ala Gly Ala
    4595                4600                4605
Pro Ala Pro Arg Thr Val Leu Ala Pro Leu Pro Ala Gly Pro Ala Asp
    4610                4615                4620
Gly Gly Ala Glu Gly Val Arg Gly Thr Val Ala Arg Thr Leu Glu Leu
4625                4630                4635                4640
Leu Gln Ala Trp Leu Ala Asp Glu His Leu Ala Gly Thr Arg Leu Leu
        4645                4650                4655
Leu Val Thr Arg Gly Ala Val Arg Asp Pro Glu Gly Ser Gly Ala Asp
        4660                4665                4670
Asp Gly Gly Glu Asp Leu Ser His Ala Ala Ala Trp Gly Leu Val Arg
        4675                4680                4685
Thr Ala Gln Thr Glu Asn Pro Gly Arg Phe Gly Leu Leu Asp Leu Ala
    4690                4695                4700
Asp Asp Ala Ser Ser Tyr Arg Thr Leu Pro Ser Val Leu Ser Asp Ala
4705                4710                4715                4720
Gly Leu Arg Asp Glu Pro Gln Leu Ala Leu His Asp Gly Thr Ile Arg
        4725                4730                4735
Leu Ala Arg Leu Ala Ser Val Arg Pro Glu Thr Gly Thr Ala Ala Pro
        4740                4745                4750
Ala Leu Ala Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Gly
        4755                4760                4765
Leu Gly Gly Leu Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg
    4770                4775                4780
Arg Leu Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Asp
4785                4790                4795                4800
Glu Leu Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala
        4805                4810                4815
Ala Cys Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ala
        4820                4825                4830
Ile Pro Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val
    4835                4840                4845
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```
Leu Ser Asp Gly Thr Leu Pro Ser Met Thr Thr Glu Asp Val Glu His
    4850                4855                4860
Val Leu Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr
4865                4870                4875                4880
Ser Thr Pro Ala Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala
            4885                4890                4895
Ala Ala Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Ala Asn
            4900                4905                4910
Ala Thr Leu Asp Ala Leu Ala Trp Arg Arg Arg Ala Ala Gly Leu Pro
    4915                4920                4925
Ala Leu Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr
    4930                4935                4940
Gly Glu Leu Gly Gln Ala Asp Leu Arg Arg Met Ser Arg Ala Gly Ile
4945                4950                4955                4960
Gly Gly Ile Ser Asp Ala Glu Gly Ile Ala Leu Leu Asp Ala Ala Leu
            4965                4970                4975
Arg Asp Asp Arg His Pro Val Leu Leu Pro Leu Arg Leu Asp Ala Ala
            4980                4985                4990
Gly Leu Arg Asp Ala Ala Gly Asn Asp Pro Ala Gly Ile Pro Ala Leu
            4995                5000                5005
Phe Arg Asp Val Val Gly Ala Arg Thr Val Arg Ala Arg Pro Ser Ala
    5010                5015                5020
Ala Ser Ala Ser Thr Thr Ala Gly Thr Ala Gly Thr Pro Gly Thr Ala
5025                5030                5035                5040
Asp Gly Ala Ala Glu Thr Ala Ala Val Thr Leu Ala Asp Arg Ala Ala
            5045                5050                5055
Thr Val Asp Gly Pro Ala Arg Gln Arg Leu Leu Leu Glu Phe Val Val
            5060                5065                5070
Gly Glu Val Ala Glu Val Leu Gly His Ala Arg Gly His Arg Ile Asp
    5075                5080                5085
Ala Glu Arg Gly Phe Leu Asp Leu Gly Phe Asp Ser Leu Thr Ala Val
    5090                5095                5100
Glu Leu Arg Asn Arg Leu Asn Ser Ala Gly Gly Leu Ala Leu Pro Ala
5105                5110                5115                5120
Thr Leu Val Phe Asp His Pro Ser Pro Ala Ala Leu Ala Ser His Leu
            5125                5130                5135
Asp Ala Glu Leu Pro Arg Gly Ala Ser Asp Gln Asp Gly Ala Gly Asn
            5140                5145                5150
Arg Asn Gly Asn Glu Asn Gly Thr Thr Ala Ser Arg Ser Thr Ala Glu
    5155                5160                5165
Thr Asp Ala Leu Leu Ala Gln Leu Thr Arg Leu Glu Gly Ala Leu Val
    5170                5175                5180
Leu Thr Gly Leu Ser Asp Ala Pro Gly Ser Glu Glu Val Leu Glu His
5185                5190                5195                5200
Leu Arg Ser Leu Arg Ser Met Val Thr Gly Glu Thr Gly Thr Gly Thr
            5205                5210                5215
Ala Ser Gly Ala Pro Asp Gly Ala Gly Ser Gly Ala Glu Asp Arg Pro
    5220                5225                5230
Trp Ala Ala Gly Asp Gly Ala Gly Gly Gly Ser Glu Asp Gly Ala Gly
    5235                5240                5245
Val Pro Asp Phe Met Asn Ala Ser Ala Glu Glu Leu Phe Gly Leu Leu
    5250                5255                5260
Asp Gln Asp Pro Ser Thr Asp Met Ser Thr Val Asn Glu Glu Lys Tyr
5265                5270                5275                5280
Leu Asp Tyr Leu Arg Arg Ala Thr Ala Asp Leu His Glu Ala Arg Gly
            5285                5290                5295
Arg Leu Arg Glu Leu Glu Ala Lys Ala Gly Glu Pro Val Ala Ile Val
    5300                5305                5310
Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu
    5315                5320                5325
Trp Arg Leu Val Ala Gly Gly Glu Asp Ala Ile Ser Glu Phe Pro Gln
    5330                5335                5340
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```
Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asn Pro Glu Ala
5345                     5350                5355                5360
Thr Gly Lys Ser Tyr Ala Arg Glu Ala Gly Phe Leu Tyr Glu Ala Gly
            5365                5370                5375
Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala
            5380                5385                5390
Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Ala Ser Trp Glu Ala Phe
            5395                5400                5405
Glu His Ala Gly Ile Pro Ala Ala Thr Ala Arg Gly Thr Ser Val Gly
            5410                5415                5420
Val Phe Thr Gly Val Met Tyr His Asp Tyr Ala Thr Arg Leu Thr Asp
5425                     5430                5435                5440
Val Pro Glu Gly Ile Glu Gly Tyr Leu Gly Thr Gly Asn Ser Gly Ser
            ·5445               5450                5455
Val Ala Ser Gly Arg Val Ala Tyr Thr Leu Gly Leu Glu Gly Pro Ala
            5460                5465                5470
Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
            5475                5480                5485
Ala Val Gln Ala Leu Arg Lys Gly Glu Val Asp Met Ala Leu Ala Gly
            5490                5495                5500
Gly Val Thr Val Met Ser Thr Pro Ser Thr Phe Val Glu Phe Ser Arg
5505                     5510                5515                5520
Gln Arg Gly Leu Ala Pro Asp Gly Arg Ser Lys Ser Phe Ser Ser Thr
            5525                5530                5535
Ala Asp Gly Thr Ser Trp Ser Glu Gly Val Gly Val Leu Leu Val Glu
            5540                5545                5550
Arg Leu Ser Asp Ala Arg Arg Lys Gly His Arg Ile Leu Ala Val Val
            5555                5560                5565
Arg Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Ser Gly Leu Thr Ala
            5570                5575                5580
Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp
5585                     5590                5595                5600
Ala Arg Leu Thr Thr Ser Asp Val Asp Val Val Glu Ala His Gly Thr
            5605                5610                5615
Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Val Ile Ala Thr
            5620                5625                5630
Tyr Gly Gln Gly Arg Asp Gly Glu Gln Pro Leu Arg Leu Gly Ser Leu
            5635                5640                5645
Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Val
            5650                5655                5660
Ile Lys Met Val Gln Ala Met Arg His Gly Val Leu Pro Lys Thr Leu
5665                     5670                5675                5680
His Val Glu Lys Pro Thr Asp Gln Val Asp Trp Ser Ala Gly Ala Val
            5685                5690                5695
Glu Leu Leu Thr Glu Ala Met Asp Trp Pro Asp Lys Gly Asp Gly Gly
            5700                5705                5710
Leu Arg Arg Ala Ala Val Ser Ser Phe Gly Val Ser Gly Thr Asn Ala
            5715                5720                5725
His Val Val Leu Glu Glu Ala Pro Ala Ala Glu Glu Thr Pro Ala Ser
            5730                5735                5740
Glu Ala Thr Pro Ala Val Glu Pro Ser Val Gly Ala Gly Leu Val Pro
5745                     5750                5755                5760
Trp Leu Val Ser Ala Lys Thr Pro Ala Ala Leu Asp Ala Gln Ile Gly
            5765                5770                5775
Arg Leu Ala Ala Phe Ala Ser Gln Gly Arg Thr Asp Ala Ala Asp Pro
            5780                5785                5790
Gly Ala Val Ala Arg Val Leu Ala Gly Gly Arg Ala Glu Phe Glu His
            5795                5800                5805
Arg Ala Val Val Leu Gly Thr Gly Gln Asp Asp Phe Ala Gln Ala Leu
            5810                5815                5820
Thr Ala Pro Glu Gly Leu Ile Arg Gly Thr Pro Ser Asp Val Gly Arg
5825                     5830                5835                5840
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```
Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly
          5845                    5850                    5855
Ala Glu Leu Leu Asp Val Ser Lys Glu Phe Ala Ala Ala Met Ala Glu
          5860                    5865                    5870
Cys Glu Ser Ala Leu Ser Arg Tyr Val Asp Trp Ser Leu Glu Ala Val
          5875                    5880                    5885
Val Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp Val Val
          5890                    5895                    5900
Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val Trp Gln
5905                    5910                    5915                    5920
His His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln Gly Glu
          5925                    5930                    5935
Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala
          5940                    5945                    5950
Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly
          5955                    5960                    5965
Lys Gly Gly Met Ile Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln
          5970                    5975                    5980
Arg Ile Glu Asn Leu His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro
5985                    5990                    5995                    6000
Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala
          6005                    6010                    6015
Gln Ala Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro Val Asp
          6020                    6025                    6030
Tyr Ala Ser His Ser Ala His Val Glu Thr Ile Glu Ser Glu Leu Ala
          6035                    6040                    6045
Glu Val Leu Ala Gly Leu Ser Pro Arg Thr Pro Glu Val Pro Phe Phe
          6050                    6055                    6060
Ser Thr Leu Glu Gly Ala Trp Ile Thr Glu Pro Val Leu Asp Gly Thr
6065                    6070                    6075                    6080
Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Val
          6085                    6090                    6095
Glu Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser
          6100                    6105                    6110
Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly Leu
          6115                    6120                    6125
Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr Ser
          6130                    6135                    6140
Leu Ala Glu Ala Trp Thr Asn Gly Leu Thr Ile Asp Trp Ala Pro Val
6145                    6150                    6155                    6160
Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr Tyr Ala Phe
          6165                    6170                    6175
Gln Arg Arg His Tyr Trp Leu His Asp Ser Pro Ala Val Gln Gly Ser
          6180                    6185                    6190
Val Gln Asp Ser Trp Arg Tyr Arg Ile Asp Trp Lys Arg Leu Ala Val
          6195                    6200                    6205
Ala Asp Ala Ser Glu Arg Ala Gly Leu Ser Gly Arg Trp Leu Val Val
          6210                    6215                    6220
Val Pro Glu Asp Arg Ser Ala Glu Ala Ala Pro Val Leu Ala Ala Leu
6225                    6230                    6235                    6240
Ser Gly Ala Gly Ala Asp Pro Val Gln Leu Asp Val Ser Pro Leu Gly
          6245                    6250                    6255
Asp Arg Gln Arg Leu Ala Ala Thr Leu Gly Glu Ala Leu Ala Ala Ala
          6260                    6265                    6270
Gly Gly Ala Val Asp Gly Val Leu Ser Leu Leu Ala Trp Asp Glu Ser
          6275                    6280                    6285
Ala His Pro Gly His Pro Ala Pro Phe Thr Arg Gly Thr Gly Ala Thr
          6290                    6295                    6300
Leu Thr Leu Val Gln Ala Leu Glu Asp Ala Gly Val Ala Ala Pro Leu
6305                    6310                    6315                    6320
Trp Cys Val Thr His Gly Ala Val Ser Val Gly Arg Ala Asp His Val
          6325                    6330                    6335
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Thr Ser Pro Ala Gln Ala Met Val Trp Gly Met Gly Arg Val Ala Ala
        6340                6345                6350
Leu Glu His Pro Glu Arg Trp Gly Gly Leu Ile Asp Leu Pro Ser Asp
        6355                6360                6365
Ala Asp Arg Ala Ala Leu Asp Arg Met Thr Thr Val Leu Ala Gly Gly
    6370                6375                6380
Thr Gly Glu Asp Gln Val Ala Val Arg Ala Ser Gly Leu Leu Ala Arg
6385                6390                6395                6400
Arg Leu Val Arg Ala Ser Leu Pro Ala His Gly Thr Ala Ser Pro Trp
            6405                6410                6415
Trp Gln Ala Asp Gly Thr Val Leu Val Thr Gly Ala Glu Glu Pro Ala
        6420                6425                6430
Ala Ala Glu Ala Ala Arg Arg Leu Ala Arg Asp Gly Ala Gly His Leu
        6435                6440                6445
Leu Leu His Thr Thr Pro Ser Gly Ser Glu Gly Ala Glu Gly Thr Ser
    6450                6455                6460
Gly Ala Ala Glu Asp Ser Gly Leu Ala Gly Leu Val Ala Glu Leu Ala
6465                6470                6475                6480
Asp Leu Gly Ala Thr Ala Thr Val Val Thr Cys Asp Leu Thr Asp Ala
            6485                6490                6495
Glu Ala Ala Ala Arg Leu Leu Ala Gly Val Ser Asp Ala His Pro Leu
        6500                6505                6510
Ser Ala Val Leu His Leu Pro Pro Thr Val Asp Ser Glu Pro Leu Ala
    6515                6520                6525
Ala Thr Asp Ala Asp Ala Leu Ala Arg Val Val Thr Ala Lys Ala Thr
    6530                6535                6540
Ala Ala Leu His Leu Asp Arg Leu Leu Arg Glu Ala Ala Ala Ala Gly
6545                6550                6555                6560
Gly Arg Pro Pro Val Leu Val Leu Phe Ser Ser Val Ala Ala Ile Trp
            6565                6570                6575
Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Gly Thr Ala Phe Leu Asp
        6580                6585                6590
Ala Leu Ala Gly Gln His Arg Ala Asp Gly Pro Thr Val Thr Ser Val
        6595                6600                6605
Ala Trp Ser Pro Trp Glu Gly Ser Arg Val Thr Glu Gly Ala Thr Gly
    6610                6615                6620
Glu Arg Leu Arg Arg Leu Gly Leu Arg Pro Leu Ala Pro Ala Thr Ala
6625                6630                6635                6640
Leu Thr Ala Leu Asp Thr Ala Leu Gly His Gly Asp Thr Ala Val Thr
            6645                6650                6655
Ile Ala Asp Val Asp Trp Ser Ser Phe Ala Pro Gly Phe Thr Thr Ala
        6660                6665                6670
Arg Pro Gly Thr Leu Leu Ala Asp Leu Pro Glu Ala Arg Arg Ala Leu
    6675                6680                6685
Asp Glu Gln Gln Ser Thr Thr Ala Ala Asp Asp Thr Val Leu Ser Arg
    6690                6695                6700
Glu Leu Gly Ala Leu Thr Gly Ala Glu Gln Gln Arg Arg Met Gln Glu
6705                6710                6715                6720
Leu Val Arg Glu His Leu Ala Val Val Leu Asn His Pro Ser Pro Glu
            6725                6730                6735
Ala Val Asp Thr Gly Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu
        6740                6745                6750
Thr Ala Val Glu Leu Arg Asn Arg Leu Lys Asn Ala Thr Gly Leu Ala
    6755                6760                6765
Leu Pro Ala Thr Leu Val Phe Asp Tyr Pro Thr Pro Arg Thr Leu Ala
    6770                6775                6780
Glu Phe Leu Leu Ala Glu Ile Leu Gly Glu Gln Ala Gly Ala Gly Glu
6785                6790                6795                6800
Gln Leu Pro Val Asp Gly Gly Val Asp Asp Glu Pro Val Ala Ile Val
            6805                6810                6815
Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu
        6820                6825                6830
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Trp Arg Leu Val Ala Gly Gly Glu Asp Ala Ile Ser Gly Phe Pro Gln
    6835                6840                6845
Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala
    6850                6855                6860
Ser Gly Arg Thr Tyr Cys Arg Ala Gly Gly Phe Leu Asp Glu Ala Gly
6865                6870                6875                6880
Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala
            6885                6890                6895
Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Val
            6900                6905                6910
Glu Asp Ala Gly Ile Asp Pro Thr Ser Leu Gln Gly Gln Gln Val Gly
    6915                6920                6925
Val Phe Ala Gly Thr Asn Gly Pro His Tyr Glu Pro Leu Leu Arg Asn
    6930                6935                6940
Thr Ala Glu Asp Leu Glu Gly Tyr Val Gly Thr Gly Asn Ala Ala Ser
6945                6950                6955                6960
Ile Met Ser Gly Arg Val Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala
            6965                6970                6975
Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu
            6980                6985                6990
Ala Val Gln Ala Leu Arg Lys Gly Glu Cys Gly Leu Ala Leu Ala Gly
    6995                7000                7005
Gly Val Thr Val Met Ser Thr Pro Thr Thr Phe Val Glu Phe Ser Arg
    7010                7015                7020
Gln Arg Gly Leu Ala Glu Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser
7025                7030                7035                7040
Ala Asp Gly Phe Gly Pro Ala Glu Gly Val Gly Met Leu Leu Val Glu
            7045                7050                7055
Arg Leu Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val
            7060                7065                7070
Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala
    7075                7080                7085
Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp
    7090                7095                7100
Ala Arg Leu Thr Thr Ala Asp Val Asp Val Val Glu Ala His Gly Thr
7105                7110                7115                7120
Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr
            7125                7130                7135
Tyr Gly Gln Gly Arg Asp Thr Glu Gln Pro Leu Arg Leu Gly Ser Leu
            7140                7145                7150
Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Ile
    7155                7160                7165
Ile Lys Met Val Gln Ala Met Arg His Gly Val Leu Pro Lys Thr Leu
    7170                7175                7180
His Val Asp Arg Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Thr Val
7185                7190                7195                7200
Glu Leu Leu Thr Glu Ala Met Asp Trp Pro Arg Lys Gln Glu Gly Gly
            7205                7210                7215
Leu Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala
            7220                7225                7230
His Ile Val Leu Glu Glu Ala Pro Val Asp Glu Asp Ala Pro Ala Asp
    7235                7240                7245
Glu Pro Ser Val Gly Gly Val Val Pro Trp Leu Val Ser Ala Lys Thr
    7250                7255                7260
Pro Ala Ala Leu Asp Ala Gln Ile Gly Arg Leu Ala Ala Phe Ala Ser
7265                7270                7275                7280
Gln Gly Arg Thr Asp Ala Ala Asp Pro Gly Ala Val Ala Arg Val Leu
            7285                7290                7295
Ala Gly Gly Arg Ala Gln Phe Glu His Arg Ala Val Ala Leu Gly Thr
    7300                7305                7310
Gly Gln Asp Asp Leu Ala Ala Ala Leu Ala Ala Pro Glu Gly Leu Val
    7315                7320                7325
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Arg Gly Val Ala Ser Gly Val Gly Arg Val Ala Phe Val Phe Pro Gly
    7330   7335   7340
Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp Val Ser
7345   7350   7355   7360
Lys Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Ala Ala Leu Ala Pro
        7365   7370   7375
Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala
        7380   7385   7390
Pro Thr Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val
        7395   7400   7405
Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Val Thr Pro Gln
    7410   7415   7420
Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala
7425   7430   7435   7440
Gly Ala Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser
        7445   7450   7455
Lys Ser Ile Gly Ala His Leu Ala Gly Gln Gly Gly Met Leu Ser Leu
        7460   7465   7470
Ala Leu Ser Glu Ala Ala Val Val Glu Arg Leu Ala Gly Phe Asp Gly
        7475   7480   7485
Leu Ser Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly
    7490   7495   7500
Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala Asp Gly
7505   7510   7515   7520
Val Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser Ala His
        7525   7530   7535
Val Glu Thr Ile Glu Ser Glu Leu Ala Asp Val Leu Ala Gly Leu Ser
        7540   7545   7550
Pro Gln Thr Pro Gln Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp
    7555   7560   7565
Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg
    7570   7575   7580
His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu
7585   7590   7595   7600
Gly Phe Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met
        7605   7610   7615
Ala Leu Pro Glu Thr Val Thr Gly Leu Gly Thr Leu Arg Arg Asp Asn
        7620   7625   7630
Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp Ala Asn
        7635   7640   7645
Gly Leu Thr Val Asp Trp Ala Ser Leu Leu Pro Thr Thr Thr Thr His
    7650   7655   7660
Pro Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg Tyr Trp Pro Gln
7665   7670   7675   7680
Pro Asp Leu Ser Ala Ala Gly Asp Ile Thr Ser Ala Gly Leu Gly Ala
        7685   7690   7695
Ala Glu His Pro Leu Leu Gly Ala Ala Val Ala Leu Ala Asp Ser Asp
        7700   7705   7710
Gly Cys Leu Leu Thr Gly Ser Leu Ser Leu Arg Thr His Pro Trp Leu
        7715   7720   7725
Ala Asp His Ala Val Ala Gly Thr Val Leu Leu Pro Gly Thr Ala Phe
    7730   7735   7740
Val Glu Leu Ala Phe Arg Ala Gly Asp Gln Val Gly Cys Asp Leu Val
7745   7750   7755   7760
Glu Glu Leu Thr Leu Asp Ala Pro Leu Val Leu Pro Arg Arg Gly Ala
        7765   7770   7775
Val Arg Val Gln Leu Ser Val Gly Ala Ser Asp Glu Ser Gly Arg Arg
        7780   7785   7790
Thr Phe Gly Leu Tyr Ala His Pro Glu Asp Ala Pro Gly Glu Ala Glu
        7795   7800   7805
Trp Thr Arg His Ala Thr Gly Val Leu Ala Ala Arg Ala Asp Arg Thr
    7810   7815   7820

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Ala Pro Val Ala Asp Pro Glu Ala Trp Pro Pro Pro Gly Ala Glu Pro
7825            7830            7835                    7840
Val Asp Val Asp Gly Leu Tyr Glu Arg Phe Ala Ala Asn Gly Tyr Gly
            7845            7850                    7855
Tyr Gly Pro Leu Phe Gln Gly Val Arg Gly Val Trp Arg Arg Gly Asp
            7860            7865                    7870
Glu Val Phe Ala Asp Val Ala Leu Pro Ala Glu Val Ala Gly Ala Glu
            7875            7880                    7885
Gly Ala Arg Phe Gly Leu His Pro Ala Leu Leu Asp Ala Ala Val Gln
            7890            7895                    7900
Ala Ala Gly Ala Gly Arg Gly Val Arg Arg Gly His Ala Ala Ala Val
7905            7910            7915                    7920
Arg Leu Glu Arg Asp Leu Leu Tyr Ala Val Gly Ala Thr Ala Leu Arg
            7925            7930                    7935
Val Arg Leu Ala Pro Ala Gly Pro Asp Thr Val Ser Val Ser Ala Ala
            7940            7945                    7950
Asp Ser Ser Gly Gln Pro Val Phe Ala Ala Asp Ser Leu Thr Val Leu
            7955            7960                    7965
Pro Val Asp Pro Ala Gln Leu Ala Ala Phe Ser Asp Pro Thr Leu Asp
7970            7975            7980
Ala Leu His Leu Leu Glu Trp Thr Ala Trp Asp Gly Ala Ala Gln Ala
7985            7990            7995                    8000
Leu Pro Gly Ala Val Val Leu Gly Gly Asp Ala Asp Gly Leu Ala Ala
            8005            8010            8015
Ala Leu Arg Ala Gly Gly Thr Glu Val Leu Ser Phe Pro Asp Leu Thr
            8020            8025            8030
Asp Leu Val Glu Ala Val Asp Arg Gly Glu Thr Pro Ala Pro Ala Thr
            8035            8040            8045
Val Leu Val Ala Cys Pro Ala Ala Gly Pro Asp Gly Pro Glu His Val
            8050            8055            8060
Arg Glu Ala Leu His Gly Ser Leu Ala Leu Met Gln Ala Trp Leu Ala
8065            8070            8075                    8080
Asp Glu Arg Phe Thr Asp Gly Arg Leu Val Leu Val Thr Arg Asp Ala
            8085            8090                    8095
Val Ala Ala Arg Ser Gly Asp Gly Leu Arg Ser Thr Gly Gln Ala Ala
            8100            8105                    8110
Val Trp Gly Leu Gly Arg Ser Ala Gln Thr Glu Ser Pro Gly Arg Phe
            8115            8120                    8125
Val Leu Leu Asp Leu Ala Gly Glu Ala Arg Thr Ala Gly Asp Ala Thr
            8130            8135                    8140
Ala Gly Asp Gly Leu Thr Thr Gly Asp Ala Thr Val Gly Gly Thr Ser
8145            8150            8155                    8160
Gly Asp Ala Ala Leu Gly Ser Ala Leu Ala Thr Ala Leu Gly Ser Gly
            8165            8170                    8175
Glu Pro Gln Leu Ala Leu Arg Asp Gly Ala Leu Leu Val Pro Arg Leu
            8180            8185                    8190
Ala Arg Ala Ala Ala Pro Ala Ala Ala Asp Gly Leu Ala Ala Ala Asp
            8195            8200                    8205
Gly Leu Ala Ala Leu Pro Leu Pro Ala Ala Pro Ala Leu Trp Arg Leu
            8210            8215            8220
Glu Pro Gly Thr Asp Gly Ser Leu Glu Ser Leu Thr Ala Ala Pro Gly
8225            8230            8235                    8240
Asp Ala Glu Thr Leu Ala Pro Glu Pro Leu Gly Pro Gly Gln Val Arg
            8245            8250                    8255
Ile Ala Ile Arg Ala Thr Gly Leu Asn Phe Arg Asp Val Leu Ile Ala
            8260            8265                    8270
Leu Gly Met Tyr Pro Asp Pro Ala Leu Met Gly Thr Glu Gly Ala Gly
            8275            8280                    8285
Val Val Thr Ala Thr Gly Pro Gly Val Thr His Leu Ala Pro Gly Asp
            8290            8295                    8300
Arg Val Met Gly Leu Leu Ser Gly Ala Tyr Ala Pro Val Val Val Ala
8305            8310            8315                    8320
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Asp Ala Arg Thr Val Ala Arg Met Pro Glu Gly Trp Thr Phe Ala Gln
          8325                8330                8335
Gly Ala Ser Val Pro Val Val Phe Leu Thr Ala Val Tyr Ala Leu Arg
          8340                8345                8350
Asp Leu Ala Asp Val Lys Pro Gly Glu Arg Leu Leu Val His Ser Ala
          8355                8360                8365
Ala Gly Gly Val Gly Met Ala Ala Val Gln Leu Ala Arg His Trp Gly
    8370                8375                8380
Val Glu Val His Gly Thr Ala Ser His Gly Lys Trp Asp Ala Leu Arg
8385                8390                8395                8400
Ala Leu Gly Leu Asp Asp Ala His Ile Ala Ser Ser Arg Thr Leu Asp
          8405                8410                8415
Phe Glu Ser Ala Phe Arg Ala Ala Ser Gly Gly Ala Gly Met Asp Val
          8420                8425                8430
Val Leu Asn Ser Leu Ala Arg Glu Phe Val Asp Ala Ser Leu Arg Leu
          8435                8440                8445
Leu Gly Pro Gly Gly Arg Phe Val Glu Met Gly Lys Thr Asp Val Arg
    8450                8455                8460
Asp Ala Glu Arg Val Ala Ala Asp His Pro Gly Val Gly Tyr Arg Ala
8465                8470                8475                8480
Phe Asp Leu Gly Glu Ala Gly Pro Glu Arg Ile Gly Glu Met Leu Ala
          8485                8490                8495
Glu Val Ile Ala Leu Phe Glu Asp Gly Val Leu Arg His Leu Pro Val
    8500                8505                8510
Thr Thr Trp Asp Val Arg Arg Ala Arg Asp Ala Phe Arg His Val Ser
    8515                8520                8525
Gln Ala Arg His Thr Gly Lys Val Val Leu Thr Met Pro Ser Gly Leu
    8530                8535                8540
Asp Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Ala Leu Gly
8545                8550                8555                8560
Gly Ile Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg Arg Leu
          8565                8570                8575
Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Gly Glu Leu
          8580                8585                8590
Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala Ala Cys
    8595                8600                8605
Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ser Ile Pro
    8610                8615                8620
Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val Leu Ser
8625                8630                8635                8640
Asp Gly Thr Leu Pro Ser Met Thr Ala Glu Asp Val Glu His Val Leu
          8645                8650                8655
Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr Ser Thr
          8660                8665                8670
Pro Gly Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala Ala Ala
    8675                8680                8685
Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Ala Asn Ala Thr
    8690                8695                8700
Leu Asp Ala Leu Ala Trp Arg Arg Arg Thr Ala Gly Leu Pro Ala Leu
8705                8710                8715                8720
Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr Gly Gly
          8725                8730                8735
Leu Ser Asp Thr Asp Arg Ser Arg Leu Ala Arg Ser Gly Ala Thr Pro
          8740                8745                8750
Met Asp Ser Glu Leu Thr Leu Ser Leu Leu Asp Ala Ala Met Arg Arg
          8755                8760                8765
Asp Asp Pro Ala Leu Val Pro Ile Ala Leu Asp Val Ala Ala Leu Arg
    8770                8775                8780
Ala Gln Gln Arg Asp Gly Met Leu Ala Pro Leu Leu Ser Gly Leu Thr
8785                8790                8795                8800
Arg Gly Ser Arg Val Gly Gly Ala Pro Val Asn Gln Arg Arg Ala Ala
          8805                8810                8815
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Ala Gly Gly Ala Gly Glu Ala Asp Thr Asp Leu Gly Gly Arg Leu Ala
          8820                    8825                    8830
Ala Met Thr Pro Asp Asp Arg Val Ala His Leu Arg Asp Leu Val Arg
          8835                    8840                    8845
Thr His Val Ala Thr Val Leu Gly His Gly Thr Pro Ser Arg Val Asp
          8850                    8855                    8860
Leu Glu Arg Ala Phe Arg Asp Thr Gly Phe Asp Ser Leu Thr Ala Val
8865                    8870                    8875                    8880
Glu Leu Arg Asn Arg Leu Asn Ala Ala Thr Gly Leu Arg Leu Pro Ala
          8885                    8890                    8895
Thr Leu Val Phe Asp His Pro Thr Pro Gly Glu Leu Ala Gly His Leu
          8900                    8905                    8910
Leu Asp Glu Leu Ala Thr Ala Ala Gly Gly Ser Trp Ala Glu Gly Thr
          8915                    8920                    8925
Gly Ser Gly Asp Thr Ala Ser Ala Thr Asp Arg Gln Thr Thr Ala Ala
          8930                    8935                    8940
Leu Ala Glu Leu Asp Arg Leu Glu Gly Val Leu Ala Ser Leu Ala Pro
8945                    8950                    8955                    8960
Ala Ala Gly Gly Arg Pro Glu Leu Ala Ala Arg Leu Arg Ala Leu Ala
          8965                    8970                    8975
Ala Ala Leu Gly Asp Asp Gly Asp Asp Ala Thr Asp Leu Asp Glu Ala
          8980                    8985                    8990
Ser Asp Asp Asp Leu Phe Ser Phe Ile Asp Lys Glu Leu Gly Asp Ser
          8995                    9000                    9005
Asp Phe Met Ala Asn Asn Glu Asp Lys Leu Arg Asp Tyr Leu Lys Arg
          9010                    9015                    9020
Val Thr Ala Glu Leu Gln Gln Asn Thr Arg Arg Leu Arg Glu Ile Glu
9025                    9030                    9035                    9040
Gly Arg Thr His Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu
          9045                    9050                    9055
Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Gln Leu Val Ala Gly
          9060                    9065                    9070
Asp Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val
          9075                    9080                    9085
Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala Ser Gly Arg Thr Tyr Cys
          9090                    9095                    9100
Arg Ser Gly Gly Phe Leu His Asp Ala Gly Glu Phe Asp Ala Asp Phe
9105                    9110                    9115                    9120
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg
          9125                    9130                    9135
Leu Ser Leu Thr Thr Ala Trp Glu Ala Ile Glu Ser Ala Gly Ile Asp
          9140                    9145                    9150
Pro Thr Ala Leu Lys Gly Ser Gly Leu Gly Val Phe Val Gly Gly Trp
          9155                    9160                    9165
His Thr Gly Tyr Thr Ser Gly Gln Thr Thr Ala Val Gln Ser Pro Glu
          9170                    9175                    9180
Leu Glu Gly His Leu Val Ser Gly Ala Ala Leu Gly Phe Leu Ser Gly
9185                    9190                    9195                    9200
Arg Ile Ala Tyr Val Leu Gly Thr Asp Gly Pro Ala Leu Thr Val Asp
          9205                    9210                    9215
Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala
          9220                    9225                    9230
Leu Arg Lys Gly Glu Cys Asp Met Ala Leu Ala Gly Gly Val Thr Val
          9235                    9240                    9245
Met Pro Asn Ala Asp Leu Phe Val Gln Phe Ser Arg Gln Arg Gly Leu
          9250                    9255                    9260
Ala Ala Asp Gly Arg Ser Lys Ala Phe Ala Thr Ser Ala Asp Gly Phe
9265                    9270                    9275                    9280
Gly Pro Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser Asp
          9285                    9290                    9295
Ala Arg Arg Asn Gly His Arg Ile Leu Ala Val Val Arg Gly Ser Ala
          9300                    9305                    9310
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Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro
        9315                9320                9325
Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Ala
    9330                9335                9340
Pro Gly Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu
9345                9350                9355                9360
Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Glu
            9365                9370                9375
Lys Ser Ser Glu Gln Pro Leu Arg Leu Gly Ala Leu Lys Ser Asn Ile
            9380                9385                9390
Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val
        9395                9400                9405
Gln Ala Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu
    9410                9415                9420
Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr
9425                9430                9435                9440
Glu Ala Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala
            9445                9450                9455
Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu
            9460                9465                9470
Glu Glu Ala Pro Ala Val Glu Asp Ser Pro Ala Val Glu Pro Pro Ala
            9475                9480                9485
Gly Gly Gly Val Val Pro Trp Pro Val Ser Ala Lys Thr Pro Ala Ala
    9490                9495                9500
Leu Asp Ala Gln Ile Gly Gln Leu Ala Ala Tyr Ala Asp Gly Arg Thr
9505                9510                9515                9520
Asp Val Asp Pro Ala Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr
            9525                9530                9535
Ala Met Glu His Arg Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu
        9540                9545                9550
Arg Asp Ala Leu Arg Met Pro Glu Gly Leu Val Arg Gly Thr Ser Ser
        9555                9560                9565
Asp Val Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp
    9570                9575                9580
Ala Gly Met Gly Ala Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala
9585                9590                9595                9600
Ser Met Ala Glu Cys Glu Thr Ala Leu Ser Arg Tyr Val Asp Trp Ser
            9605                9610                9615
Leu Glu Ala Val Val Arg Gln Glu Pro Gly Ala Pro Thr Leu Asp Arg
        9620                9625                9630
Val Asp Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala
    9635                9640                9645
Lys Val Trp Gln His His Gly Ile Thr Pro Gln Ala Val Val Gly His
    9650                9655                9660
Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu
9665                9670                9675                9680
Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala
            9685                9690                9695
His Leu Ala Gly Lys Gly Gly Met Ile Ser Leu Ala Leu Asp Glu Ala
        9700                9705                9710
Ala Val Leu Lys Arg Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala
        9715                9720                9725
Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile
    9730                9735                9740
Glu Glu Leu Ala Arg Thr Cys Glu Ala Asp Gly Val Arg Ala Arg Ile
9745                9750                9755                9760
Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu
            9765                9770                9775
Lys Glu Leu Ala Glu Val Leu Ala Gly Leu Ala Pro Gln Ala Pro His
            9780                9785                9790
Val Pro Phe Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val
    9795                9800                9805
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Leu Asp Gly Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe
    9810   9815   9820
Ala Pro Ala Val Glu Thr Leu Ala Val Asp Gly Phe Thr His Phe Ile
9825   9830   9835   9840
Glu Val Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val
         9845   9850   9855
Thr Gly Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu
         9860   9865   9870
Val Thr Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Ile Asp Trp
         9875   9880   9885
Ala Pro Ile Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr
    9890   9895   9900
Tyr Ala Phe Gln Thr Glu Arg Phe Trp Leu Gln Ser Ser Ala Pro Thr
9905   9910   9915   9920
Ser Ala Ala Asp Asp Trp Arg Tyr Arg Val Glu Trp Lys Pro Leu Thr
         9925   9930   9935
Ala Ser Gly Gln Ala Asp Leu Ser Gly Arg Trp Ile Val Ala Val Gly
         9940   9945   9950
Ser Glu Pro Glu Ala Glu Leu Leu Gly Ala Leu Lys Ala Ala Gly Ala
         9955   9960   9965
Glu Val Asp Val Leu Glu Ala Gly Ala Asp Asp Asp Arg Glu Ala Leu
    9970   9975   9980
Ala Ala Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr Gly Val
9985   9990   9995   10000
Val Ser Leu Leu Asp Asp Leu Val Pro Gln Val Ala Trp Val Gln Ala
         10005   10010   10015
Leu Gly Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr Gln Gly
         10020   10025   10030
Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp Arg Ala
         10035   10040   10045
Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro Glu Arg
    10050   10055   10060
Trp Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala Ala Leu
10065   10070   10075   10080
Ala His Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp Gln Ile
         10085   10090   10095
Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg Ala Pro
    10100   10105   10110
Leu His Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly Thr Val
    10115   10120   10125
Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala Arg Trp
    10130   10135   10140
Met Ala His His Gly Ala Glu His Leu Leu Leu Val Ser Arg Ser Gly
10145   10150   10155   10160
Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr Ala Ser
         10165   10170   10175
Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro His Ala
         10180   10185   10190
Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala
         10195   10200   10205
Val Val His Thr Ala Gly Ala Pro Gly Gly Asp Pro Leu Asp Val Thr
    10210   10215   10220
Gly Pro Glu Asp Ile Ala Arg Ile Leu Gly Ala Lys Thr Ser Gly Ala
10225   10230   10235   10240
Glu Val Leu Asp Asp Leu Leu Arg Gly Thr Pro Leu Asp Ala Phe Val
         10245   10250   10255
Leu Tyr Ser Ser Asn Ala Gly Val Trp Gly Ser Gly Ser Gln Gly Val
         10260   10265   10270
Tyr Ala Ala Ala Asn Ala His Leu Asp Ala Leu Ala Ala Arg Arg Arg
    10275   10280   10285
Ala Arg Gly Glu Thr Ala Thr Ser Val Ala Trp Gly Leu Trp Ala Gly
    10290   10295   10300

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```
Asp   Gly Met Gly Arg Gly Ala Asp Asp Ala Tyr Trp Gln Arg Arg Gly
10305               10310               10315               10320
Ile Arg Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala
          10325               10330               10335
Leu Ser His Asp Glu Thr Phe Val Ala Val Ala Asp Val Asp Trp Glu
        10340               10345               10350
Arg Phe Ala Pro Ala Phe Thr Val Ser Arg Pro Ser Leu Leu Leu Asp
          10355               10360               10365
Gly Val Pro Glu Ala Arg Gln Ala Leu Ala Ala Pro Val Gly Ala Pro
    10370               10375               10380
Ala   Pro Gly Asp Ala Ala Val Ala Pro Thr Gly Gln Ser Ser Ala Leu
10385               10390               10395               10400
Ala Ala Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu
          10405               10410               10415
Thr Leu Val Arg Thr His Ala Ala Ala Val Leu Gly His Ser Ser Pro
        10420               10425               10430
Asp Arg Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser
        10435               10440               10445
Leu Thr Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn
    10450               10455               10460
Arg   Leu Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu
10465               10470               10475               10480
Ala Ala His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro
          10485               10490               10495
Thr Asp Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu
        10500               10505               10510
Asp Arg Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr
        10515               10520               10525
Gly Ile Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala
    10530               10535               10540
Asp   Pro Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu
10545               10550               10555               10560
Ala Leu Ile Arg Met Ala Leu Gly Pro Arg Asn Thr Met Thr Ser Ser
          10565               10570               10575
Asn Glu Gln Leu Val Asp Ala Leu Arg Ala Ser Leu Lys Glu Asn Glu
        10580               10585               10590
Glu Leu Arg Lys Glu Ser Arg Arg Arg Ala Asp Arg Arg Gln Glu Pro
    10595               10600               10605
Met Ala Ile Val Gly Met Ser Cys Arg Phe Ala Gly Gly Ile Arg Ser
    10610               10615               10620
Pro   Glu Asp Leu Trp Asp Ala Val Ala Ala Gly Lys Asp Leu Val Ser
10625               10630               10635               10640
Glu Val Pro Glu Glu Arg Gly Trp Asp Ile Asp Ser Leu Tyr Asp Pro
          10645               10650               10655
Val Pro Gly Arg Lys Gly Thr Thr Tyr Val Arg Asn Ala Ala Phe Leu
        10660               10665               10670
Asp Asp Ala Ala Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg
        10675               10680               10685
Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Gln Leu Leu Glu Ala Ser
    10690               10695               10700
Trp   Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Ala Ser Val Arg Gly
10705               10710               10715               10720
Thr Asp Val Gly Val Tyr Val Gly Cys Gly Tyr Gln Asp Tyr Ala Pro
          10725               10730               10735
Asp Ile Arg Val Ala Pro Glu Gly Thr Gly Gly Tyr Val Val Thr Gly
        10740               10745               10750
Asn Ser Ser Ala Val Ala Ser Gly Arg Ile Ala Tyr Ser Leu Gly Leu
    10755               10760               10765
Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val
    10770               10775               10780
Ala   Leu His Leu Ala Leu Lys Gly Leu Arg Asn Gly Asp Cys Ser Thr
10785               10790               10795               10800
```

                                    58

```
Ala Leu Val Gly Gly Val Ala Val Leu Ala Thr Pro Gly Ala Phe Ile
         10805                10810                10815
Glu Phe Ser Ser Gln Gln Ala Met Ala Ala Asp Gly Arg Thr Lys Gly
         10820                10825                10830
Phe Ala Ser Ala Ala Asp Gly Leu Ala Trp Gly Glu Gly Val Ala Val
         10835                10840                10845
Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Lys Gly His Arg Val
        10850                10855                10860
Leu  Ala Val Val Arg Gly Ser Ala Ile Asn Gln Asp Gly Ala Ser Asn
10865                10870                10875                10880
Gly Leu Thr Ala Pro His Gly Pro Ser Gln Gln His Leu Ile Arg Gln
         10885                10890                10895
Ala Leu Ala Asp Ala Arg Leu Thr Ser Ser Asp Val Asp Val Val Glu    :
         10900                10905                10910
Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala
         10915                10920                10925
Leu Leu Ala Thr Tyr Gly Gln Gly Arg Ala Pro Gly Gln Pro Leu Arg
        10930                10935                10940
Leu  Gly Thr Leu Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ser Gly
10945                10950                10955                10960
Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg His Gly Val Leu
         10965                10970                10975
Pro Lys Thr Leu His Val Asp Glu Pro Thr Asp Gln Val Asp Trp Ser
         10980                10985                10990
Ala Gly Ser Val Glu Leu Leu Thr Glu Ala Val Asp Trp Pro Glu Arg
         10995                11000                11005
Pro Gly Arg Leu Arg Arg Ala Gly Val Ser Ala Phe Gly Val Gly Gly
        11010                11015                11020
Thr  Asn Ala His Val Val Leu Glu Glu Ala Pro Ala Val Glu Glu Ser
11025                11030                11035                11040
Pro Ala Val Glu Pro Pro Ala Gly Gly Val Val Pro Trp Pro Val
         11045                11050                11055
Ser Ala Lys Thr Ser Ala Ala Leu Asp Ala Gln Ile Gly Gln Leu Ala
         11060                11065                11070
Ala Tyr Ala Glu Asp Arg Thr Asp Val Asp Pro Ala Val Ala Ala Arg
        11075                11080                11085
Ala Leu Val Asp Ser Arg Thr Ala Met Glu His Arg Ala Val Ala Val
        11090                11095                11100
Gly  Asp Ser Arg Glu Ala Leu Arg Asp Ala Leu Arg Met Pro Glu Gly
11105                11110                11115                11120
Leu Val Arg Gly Thr Val Thr Asp Pro Gly Arg Val Ala Phe Val Phe
        11125                11130                11135
Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp
        11140                11145                11150
Ser Ser Pro Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Thr Ala Leu
        11155                11160                11165
Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro
        11170                11175                11180
Ser  Ala Pro Thr Leu Asp Arg Val Asp Val Val Gln Pro Val Thr Phe
11185                11190                11195                11200
Ala Val Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Ile Thr
        11205                11210                11215
Pro Glu Ala Val Ile Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr
        11220                11225                11230
Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg Val Val Thr Leu
        11235                11240                11245
Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Ile
        11250                11255                11260
Ser  Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg Ile Glu Asn Leu
11265                11270                11275                11280
His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val
        11285                11290                11295
```

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```
Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala
      11300               11305               11310
Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser
      11315               11320               11325
Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp Val Leu Ala Gly
     11330               11335               11340
Leu  Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser Thr Leu Glu Gly
11345               11350               11355               11360
Thr Trp Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn
               11365               11370               11375
Leu Arg His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr
               11380               11385               11390
Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala His Pro Val Leu
      11395               11400               11405
Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala Thr Leu Arg Arg
     11410               11415               11420
Glu  Asp Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp
11425               11430               11435               11440
Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu Pro Ala Thr Gly
               11445               11450               11455
Ala Leu Ser Pro Ala Val Pro Asp Leu Pro Thr Tyr Ala Phe Gln His
           11460               11465               11470
Arg Ser Tyr Trp Ile Ser Pro Ala Gly Pro Gly Glu Ala Pro Ala His
           11475               11480               11485
Thr Ala Ser Gly Arg Glu Ala Val Ala Glu Thr Gly Leu Ala Trp Gly
      11490               11495               11500
Pro  Gly Ala Glu Asp Leu Asp Glu Glu Gly Arg Arg Ser Ala Val Leu
11505               11510               11515               11520
Ala Met Val Met Arg Gln Ala Ala Ser Val Leu Arg Cys Asp Ser Pro
           11525               11530               11535
Glu Glu Val Pro Val Asp Arg Pro Leu Arg Glu Ile Gly Phe Asp Ser
      11540               11545               11550
Leu Thr Ala Val Asp Phe Arg Asn Arg Val Asn Arg Leu Thr Gly Leu
      11555               11560               11565
Gln Leu Pro Pro Thr Val Val Phe Gln His Pro Thr Pro Val Ala Leu
      11570               11575               11580
Ala  Glu Arg Ile Ser Asp Glu Leu Ala Glu Arg Asn Trp Ala Val Ala
11585               11590               11595               11600
Glu Pro Ser Asp His Glu Gln Ala Glu Glu Glu Lys Ala Ala Ala Pro
           11605               11610               11615
Ala Gly Ala Arg Ser Gly Ala Asp Thr Gly Ala Gly Ala Gly Met Phe
           11620               11625               11630
Arg Ala Leu Phe Arg Gln Ala Val Glu Asp Asp Arg Tyr Gly Glu Phe
           11635               11640               11645
Leu Asp Val Leu Ala Glu Ala Ser Ala Phe Arg Pro Gln Phe Ala Ser
     11650               11655               11660
Pro  Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu Leu Ala Gly Gly
11665               11670               11675               11680
Pro Thr Asp Arg Ala Glu Gly Arg Ala Val Leu Val Gly Cys Thr Gly
           11685               11690               11695
Thr Ala Ala Asn Gly Gly Pro His Glu Phe Leu Arg Leu Ser Thr Ser
           11700               11705               11710
Phe Gln Glu Glu Arg Asp Phe Leu Ala Val Pro Leu Pro Gly Tyr Gly
           11715               11720               11725
Thr Gly Thr Gly Thr Gly Thr Ala Leu Leu Pro Ala Asp Leu Asp Thr
     11730               11735               11740
Ala  Leu Asp Ala Gln Ala Arg Ala Ile Leu Arg Ala Ala Gly Asp Ala
11745               11750               11755               11760
Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu Leu Ala His Glu
           11765               11770               11775
Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro Pro Ala Gly Ile
     11780               11785               11790
```

60

```
Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu Pro Ile Glu Val
    11795                11800              11805
Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly Glu Leu Glu Pro
    11810                11815              11820
Met  Ser Asp Ala Arg Leu Leu Ala Met Gly Arg Tyr Ala Arg Phe Leu
11825                11830              11835              11840
Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val Leu Leu Val Arg
                11845              11850              11855
Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg Gly Asp Trp Arg
            11860              11865              11870
Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val Pro Gly Asp His
            11875              11880              11885
Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala Glu Ala Val Leu
    11890                11895              11900
Ser  Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala Gly Lys Met Thr
11905                11910              11915              11920
Asp Arg Pro Leu Asn Val Asp Ser Gly Leu Trp Ile Arg Arg Phe His
                11925              11930              11935
Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys Leu Pro His Ala Gly
            11940              11945              11950
Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu Glu Leu His Pro Ser
        11955              11960               11965
Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg Arg Ala
    11970                11975              11980
Glu  Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val Val Ala
11985                11990              11995              12000
Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe Gly His
                12005              12010              12015
Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu Glu Gln
        12020              12025              12030
Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg Arg Ala
        12035              12040              12045
Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp Arg Ala
    12050                12055              12060
Phe  Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg Phe Leu
12065                12070              12075              12080
Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg Ser Asp
                12085              12090              12095
Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys Leu Thr
        12100              12105              12110
Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala Pro Leu
        12115              12120              12125
Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe Cys Leu
    12130                12135              12140
Arg  Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp His Glu
12145                12150              12155              12160
Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly Ala Pro
                12165              12170              12175
Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly Ala Ala
        12180              12185              12190
Lys Arg Trp Gln Asn Pro Arg
    12195
```

```
```

```
gccctcgaca gccagtggct gtccaacggc ggcccgctcg tccgcgagtt cgaggagcgc    180
gtcgccgggc tcgccggggt ccggcatgcc gtggccacct gcaacgccac ggccgggctc    240
cagctcctcg cgcacgccgc cggcctcacc ggcgaagtga tcatgccgtc gatgacgttc    300
gccgccaccc cgcacgcact gcgctggatc ggcctcaccc cggtcttcgc cgacatcgac    360
ccggacaccg gcaacctcga cccggaccag gtggccgccg cggtcacacc ccgcacctcg    420
gccgtcgtcg gcgtccacct ctggggccgc ccctgcgccg ccgaccagct gcggaaggtc    480
gccgacgagc acggcctgcg gctgtacttc gacgccgcgc acgccctcgg ctgcgcggtc    540
gacggccggc cgccggcag cctcggcgac gccgaggtct tcagcttcca cgccaccaag    600
gccgtcaacg ccttcgaggg cggcgccgtc gtcaccgacg acgccgacct cgccgcccgg    660
atccgcgccc tccacaactt cggcttcgac ctgccgggcg gcagccccgc cggcgggacc    720
aacgccaaga tgagcgaggc cgccgccgcc atgggcctca cctccctcga cgcgtttccc    780
gaggtcatcg accggaaccg cgcgaaccac gccgcctacc gcgagcacct cgcggacctc    840
cccggcgtcc tcgtcgccga ccacgaccgc cacggcctca acaaccacca gtacgtgatc    900
gtcgagatcg acgaggccac caccggcatc caccgcgacc tcgtcatgga ggtcctgaag    960
gccgaaggcg tgcacacccg cgcctacttc tcgccgggct gccacgagct ggagccgtac   1020
cgcgggcagc cgcacgcccc gctgccgcac accgaacgcc tcgccgcgcg cgtgctgtcc   1080
ctgccgaccg gcaccgccat cggcgacgac gacatccgcc gggtcgccga cctgctgcgt   1140
ctctgcgcga cccgcggccg cgaactgacc gcgcgccacc gcgacacggc ccccgccccg   1200
ctcgcggccc cccagacatc cacgcccacg attggacgct cccgatga               1248
```

<210> 8
<211> 415
<212> PRT
<213> Streptomyces venezuelae

<400> 8

```
Met Lys Ser Ala Leu Ser Asp Leu Ala Phe Phe Gly Gly Pro Ala Ala
 1               5                  10                  15
Phe Asp Gln Pro Leu Leu Val Gly Arg Pro Asn Arg Ile Asp Arg Ala
             20                  25                  30
Arg Leu Tyr Glu Arg Leu Asp Arg Ala Leu Asp Ser Gln Trp Leu Ser
         35                  40                  45
Asn Gly Gly Pro Leu Val Arg Glu Phe Glu Glu Arg Val Ala Gly Leu
     50                  55                  60
Ala Gly Val Arg His Ala Val Ala Thr Cys Asn Ala Thr Ala Gly Leu
65                  70                  75                  80
Gln Leu Leu Ala His Ala Ala Gly Leu Thr Gly Glu Val Ile Met Pro
                 85                  90                  95
Ser Met Thr Phe Ala Ala Thr Pro His Ala Leu Arg Trp Ile Gly Leu
             100                 105                 110
Thr Pro Val Phe Ala Asp Ile Asp Pro Asp Thr Gly Asn Leu Asp Pro
         115                 120                 125
Asp Gln Val Ala Ala Ala Val Thr Pro Arg Thr Ser Ala Val Val Gly
     130                 135                 140
Val His Leu Trp Gly Arg Pro Cys Ala Ala Asp Gln Leu Arg Lys Val
145                 150                 155                 160
Ala Asp Glu His Gly Leu Arg Leu Tyr Phe Asp Ala Ala His Ala Leu
                 165                 170                 175
Gly Cys Ala Val Asp Gly Arg Pro Ala Gly Ser Leu Gly Asp Ala Glu
             180                 185                 190
Val Phe Ser Phe His Ala Thr Lys Ala Val Asn Ala Phe Glu Gly Gly
         195                 200                 205
Ala Val Val Thr Asp Asp Ala Asp Leu Ala Ala Arg Ile Arg Ala Leu
     210                 215                 220
His Asn Phe Gly Phe Asp Leu Pro Gly Gly Ser Pro Ala Gly Gly Thr
225                 230                 235                 240
Asn Ala Lys Met Ser Glu Ala Ala Ala Met Gly Leu Thr Ser Leu
                 245                 250                 255
Asp Ala Phe Pro Glu Val Ile Asp Arg Asn Arg Arg Asn His Ala Ala
             260                 265                 270
Tyr Arg Glu His Leu Ala Asp Leu Pro Gly Val Leu Val Ala Asp His
         275                 280                 285
```

62

```
Asp Arg His Gly Leu Asn Asn His Gln Tyr Val Ile Val Glu Ile Asp
    290                 295                 300
Glu Ala Thr Thr Gly Ile His Arg Asp Leu Val Met Glu Val Leu Lys
305                 310                 315                 320
Ala Glu Gly Val His Thr Arg Ala Tyr Phe Ser Pro Gly Cys His Glu
            325                 330                 335
Leu Glu Pro Tyr Arg Gly Gln Pro His Ala Pro Leu Pro His Thr Glu
            340                 345                 350
Arg Leu Ala Ala Arg Val Leu Ser Leu Pro Thr Gly Thr Ala Ile Gly
        355                 360                 365
Asp Asp Asp Ile Arg Arg Val Ala Asp Leu Leu Arg Leu Cys Ala Thr
    370                 375                 380
Arg Gly Arg Glu Leu Thr Ala Arg His Arg Asp Thr Ala Pro Ala Pro
385                 390                 395                 400
Leu Ala Ala Pro Gln Thr Ser Thr Pro Thr Ile Gly Arg Ser Arg
            405                 410                 415
```

<210> 9
<211> 1458
<212> DNA
<213> Streptomyces venezuelae

<400> 9
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atgaccgccc ccgccctttc cgccaccgcc ccggccgaac gctgcgcgca ccccggagcc      60
gatctggggg cggcggtcca cgccgtcggc cagaccctcg ccgccggcgg cctcgtgccg     120
cccgacgagg ccggaacgac cgccccgccac ctcgtccggc tcgccgtgcg ctacggcaac     180
agccccttca ccccgctgga ggaggcccgc cacgacctgg gcgtcgaccg ggacgccttc     240
cggcgcctcc tcgccctgtt cgggcaggtc ccggagctcc gcaccgcggt cgagaccggc     300
cccgccgggg cgtactggaa gaacaccctg ctcccgctcg aacagcgcgg cgtcttcgac     360
gcggcgctcg ccaggaagcc cgtcttcccg tacagcgtcg gcctctaccc cggcccgacc     420
tgcatgttcc gctgccactt ctgcgtccgt gtgaccggcg cccgctacga cccgtccgcc     480
ctcgacgccg gcaacgccat gttccggtcg gtcatcgacg agatacccgc gggcaacccc     540
tcggcgatgt acttctccgg cggcctggag ccgctcacca ccccggcct cgggagcctg     600
gccgcgcacg ccaccgacca cggcctgcgg cccaccgtct acacgaactc cttcgcgctc     660
accgagcgca ccctggagcg ccagcccggc ctctgggggc tgcacgccat ccgcacctcg     720
ctctacggcc tcaacgacga ggagtacgag cagaccaccg gcaagaaggc cgccttccgc     780
cgcgtccgcg agaacctgcg ccgcttccag cagctgcgcg ccgagcgcga gtcgccgatc     840
aacctcggct cgcctacat cgtgctcccg ggccgtgcct cccgcctgct cgacctggtc     900
gacttcatcg ccgacctcaa cgacgccggg cagggcagga cgatcgactt cgtcaacatt     960
cgcgaggact acagcggccg tgacgacggc aagctgccgc aggaggagcg ggccgagctc    1020
caggaggccc tcaacgcctt cgaggagcgg gtccgcgagc gcaccccccgg actccacatc    1080
gactacggct acgccctgaa cagcctgcgc accggggccg acgccgaact gctgcggatc    1140
aagcccgcca ccatgcggcc caccgcgcac ccgcaggtcg cggtgcaggt cgatctcctc    1200
ggcgacgtgt acctgtaccg cgaggccggc ttccccgacc tggacggcgc gacccgctac    1260
atcgcgggcc gcgtgacccc cgacacctcc ctcaccgagg tcgtcaggga cttcgtcgag    1320
cgcggcggcg aggtggcggc cgtcgacggc gacgagtact catggacgg cttcgatcag    1380
gtcgtcaccg cccgcctgaa ccagctggag cgcgacgccg cggacggctg ggaggaggcc    1440
cgcggcttcc tgcgctga                                                  1458
```

<210> 10
<211> 485
<212> PRT
<213> Streptomyces venezuelae

<400> 10
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Met Thr Ala Pro Ala Leu Ser Ala Thr Ala Pro Ala Glu Arg Cys Ala
1               5                   10                  15
His Pro Gly Ala Asp Leu Gly Ala Ala Val His Ala Val Gly Gln Thr
            20                  25                  30
Leu Ala Ala Gly Gly Leu Val Pro Pro Asp Glu Ala Gly Thr Thr Ala
        35                  40                  45
```

63

Arg His Leu Val Arg Leu Ala Val Arg Tyr Gly Asn Ser Pro Phe Thr
    50   55   60
Pro Leu Glu Glu Ala Arg His Asp Leu Gly Val Asp Arg Asp Ala Phe
65   70   75   80
Arg Arg Leu Leu Ala Leu Phe Gly Gln Val Pro Glu Leu Arg Thr Ala
                85   90   95
Val Glu Thr Gly Pro Ala Gly Ala Tyr Trp Lys Asn Thr Leu Leu Pro
            100   105   110
Leu Glu Gln Arg Gly Val Phe Asp Ala Ala Leu Ala Arg Lys Pro Val
            115   120   125
Phe Pro Tyr Ser Val Gly Leu Tyr Pro Gly Pro Thr Cys Met Phe Arg
    130   135   140
Cys His Phe Cys Val Arg Val Thr Gly Ala Arg Tyr Asp Pro Ser Ala
145   150   155   160
Leu Asp Ala Gly Asn Ala Met Phe Arg Ser Val Ile Asp Glu Ile Pro
                165   170   175
Ala Gly Asn Pro Ser Ala Met Tyr Phe Ser Gly Gly Leu Glu Pro Leu
                180   185   190
Thr Asn Pro Gly Leu Gly Ser Leu Ala Ala His Ala Thr Asp His Gly
            195   200   205
Leu Arg Pro Thr Val Tyr Thr Asn Ser Phe Ala Leu Thr Glu Arg Thr
    210   215   220
Leu Glu Arg Gln Pro Gly Leu Trp Gly Leu His Ala Ile Arg Thr Ser
225   230   235   240
Leu Tyr Gly Leu Asn Asp Glu Glu Tyr Glu Gln Thr Thr Gly Lys Lys
                245   250   255
Ala Ala Phe Arg Arg Val Arg Glu Asn Leu Arg Arg Phe Gln Gln Leu
                260   265   270
Arg Ala Glu Arg Glu Ser Pro Ile Asn Leu Gly Phe Ala Tyr Ile Val
            275   280   285
Leu Pro Gly Arg Ala Ser Arg Leu Leu Asp Leu Val Asp Phe Ile Ala
    290   295   300
Asp Leu Asn Asp Ala Gly Gln Gly Arg Thr Ile Asp Phe Val Asn Ile
305   310   315   320
Arg Glu Asp Tyr Ser Gly Arg Asp Asp Gly Lys Leu Pro Gln Glu Glu
                325   330   335
Arg Ala Glu Leu Gln Glu Ala Leu Asn Ala Phe Glu Glu Arg Val Arg
            340   345   350
Glu Arg Thr Pro Gly Leu His Ile Asp Tyr Gly Tyr Ala Leu Asn Ser
            355   360   365
Leu Arg Thr Gly Ala Asp Ala Glu Leu Leu Arg Ile Lys Pro Ala Thr
    370   375   380
Met Arg Pro Thr Ala His Pro Gln Val Ala Val Gln Val Asp Leu Leu
385   390   395   400
Gly Asp Val Tyr Leu Tyr Arg Glu Ala Gly Phe Pro Asp Leu Asp Gly
                405   410   415
Ala Thr Arg Tyr Ile Ala Gly Arg Val Thr Pro Asp Thr Ser Leu Thr
            420   425   430
Glu Val Val Arg Asp Phe Val Glu Arg Gly Gly Glu Val Ala Ala Val
    435   440   445
Asp Gly Asp Glu Tyr Phe Met Asp Gly Phe Asp Gln Val Val Thr Ala
    450   455   460
Arg Leu Asn Gln Leu Glu Arg Asp Ala Ala Asp Gly Trp Glu Glu Ala
465   470   475   480
Arg Gly Phe Leu Arg
            485

<210> 11
<211> 879
<212> DNA
<213> Streptomyces venezuelae

64

<400> 11
```
atgaagggaa tagtcctggc cggcgggagc ggaactcggc tgcatccggc gacctcggtc      60
atttcgaagc agattcttcc ggtctacaac aaaccgatga tctactatcc gctgtcggtt     120
ctcatgctcg gcggtattcg cgagattcaa atcatctcga ccccccagca catcgaactc     180
ttccagtcgc ttctcggaaa cggcaggcac ctgggaatag aactcgacta tgcggtccag     240
aaagagcccg caggaatcgc ggacgcactt ctcgtcggag ccgagcacat cggcgacgac     300
acctgcgccc tgatcctggg cgacaacatc ttccacgggc ccggcctcta cacgctcctg     360
cgggacagca tcgcgcgcct cgacggctgc gtgctcttcg gctacccggt caaggacccc     420
gagcggtacg gcgtcgccga ggtggacgcg acgggccggc tgaccgacct cgtcgagaag     480
cccgtcaagc gcgctccaa cctcgccgtc accggcctct acctctacga caacgacgtc     540
gtcgacatcg ccaagaacat ccggcccctcg ccgcgcggcg agctggagat caccgacgtc     600
aaccgcgtct acctggagcg gggccgggcc gaactcgtca acctgggccg cggcttcgcc     660
tggctggaca ccggcaccca cgactcgctc ctgcgggccg cccagtacgt ccaggtcctg     720
gaggagcggc agggcgtctg gatcgcgggc cttgaggaga tcgccttccg catgggcttc     780
atcgacgccg aggcctgtca cggcctggga gaaggcctct cccgcaccga gtacggcagc     840
tatctgatgg agatcgccgg ccgcgaggga gccccgtga                          879
```

<210> 12
<211> 292
<212> PRT
<213> Streptomyces venezuelae

<400> 12
```
Met Lys Gly Ile Val Leu Ala Gly Gly Ser Gly Thr Arg Leu His Pro
1               5                   10                  15
Ala Thr Ser Val Ile Ser Lys Gln Ile Leu Pro Val Tyr Asn Lys Pro
            20                  25                  30
Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Gly Gly Ile Arg Glu
        35                  40                  45
Ile Gln Ile Ile Ser Thr Pro Gln His Ile Glu Leu Phe Gln Ser Leu
    50                  55                  60
Leu Gly Asn Gly Arg His Leu Gly Ile Glu Leu Asp Tyr Ala Val Gln
65                  70                  75                  80
Lys Glu Pro Ala Gly Ile Ala Asp Ala Leu Leu Val Gly Ala Glu His
            85                  90                  95
Ile Gly Asp Asp Thr Cys Ala Leu Ile Leu Gly Asp Asn Ile Phe His
            100                 105                 110
Gly Pro Gly Leu Tyr Thr Leu Leu Arg Asp Ser Ile Ala Arg Leu Asp
        115                 120                 125
Gly Cys Val Leu Phe Gly Tyr Pro Val Lys Asp Pro Glu Arg Tyr Gly
    130                 135                 140
Val Ala Glu Val Asp Ala Thr Gly Arg Leu Thr Asp Leu Val Glu Lys
145                 150                 155                 160
Pro Val Lys Pro Arg Ser Asn Leu Ala Val Thr Gly Leu Tyr Leu Tyr
                165                 170                 175
Asp Asn Asp Val Val Asp Ile Ala Lys Asn Ile Arg Pro Ser Pro Arg
                180                 185                 190
Gly Glu Leu Glu Ile Thr Asp Val Asn Arg Val Tyr Leu Glu Arg Gly
        195                 200                 205
Arg Ala Glu Leu Val Asn Leu Gly Arg Gly Phe Ala Trp Leu Asp Thr
    210                 215                 220
Gly Thr His Asp Ser Leu Leu Arg Ala Ala Gln Tyr Val Gln Val Leu
225                 230                 235                 240
Glu Glu Arg Gln Gly Val Trp Ile Ala Gly Leu Glu Glu Ile Ala Phe
                245                 250                 255
Arg Met Gly Phe Ile Asp Ala Glu Ala Cys His Gly Leu Gly Glu Gly
                260                 265                 270
Leu Ser Arg Thr Glu Tyr Gly Ser Tyr Leu Met Glu Ile Ala Gly Arg
        275                 280                 285
Glu Gly Ala Pro
290
```

65

<210> 13
<211> 1014
<212> DNA
<213> Streptomyces venezuelae

<400> 13
gtgcggcttc tggtgaccgg aggtgcgggc ttcatcggct cgcacttcgt gcggcagctc   60
ctcgccgggg cgtaccccga cgtgcccgcc gatgaggtga tcgtcctgga cagcctcacc   120
tacgcgggca accgcgccaa cctcgccccg gtggacgcgg acccgcgact gcgcttcgtc   180
cacggcgaca tccgcgacgc cggcctcctc gcccgggaac tgcgcggcgt ggacgccatc   240
gtccacttcg cggccgagag ccacgtggac cgctccatcg cgggcgcgtc cgtgttcacc   300
gagaccaacg tgcagggcac gcagacgctg ctccagtgcg ccgtcgacgc cggcgtcggc   360
cgggtcgtgc acgtctccac cgacgaggtg tacgggtcga tcgactccgg ctcctggacc   420
gagagcagcc cgctggagcc caactcgccc tacgcggcgt ccaaggccgg ctccgacctc   480
gttgcccgcg cctaccaccg gacgtacggc ctcgacgtac ggatcacccg ctgctgcaac   540
aactacgggc cgtaccagca ccccgagaag ctcatccccc tcttcgtgac gaacctcctc   600
gacggcggga cgctcccgct gtacggcgac ggcgcgaacg tccgcgagtg ggtgcacacc   660
gacgaccact gccgggggcat cgcgctcgtc ctcgcgggcg gccgggccgg cgagatctac   720
cacatcggcg gcggcctgga gctgaccaac cgcgaactca ccggcatcct cctggactcg   780
ctcggcgccg actggtcctc ggtccggaag gtcgccgacc gcaagggcca cgacctgcgc   840
tactccctcg acggcggcga gatcgagcgc gagctcggct accgcccgca ggtctccttc   900
gcggacggcc tcgcgcggac cgtccgctgg taccgggaga accgcggctg gtgggagccg   960
ctcaaggcga ccgccccgca gctgcccgcc accgccgtgg aggtgtccgc gtga   1014

<210> 14
<211> 337
<212> PRT
<213> Streptomyces venezuelae

<400> 14
Met Arg Leu Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe
1   5   10   15
Val Arg Gln Leu Leu Ala Gly Ala Tyr Pro Asp Val Pro Ala Asp Glu
                20   25   30
Val Ile Val Leu Asp Ser Leu Thr Tyr Ala Gly Asn Arg Ala Asn Leu
            35   40   45
Ala Pro Val Asp Ala Asp Pro Arg Leu Arg Phe Val His Gly Asp Ile
        50   55   60
Arg Asp Ala Gly Leu Leu Ala Arg Glu Leu Arg Gly Val Asp Ala Ile
65   70   75   80
Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Gly Ala
                85   90   95
Ser Val Phe Thr Glu Thr Asn Val Gln Gly Thr Gln Thr Leu Leu Gln
                100   105   110
Cys Ala Val Asp Ala Gly Val Gly Arg Val Val His Val Ser Thr Asp
            115   120   125
Glu Val Tyr Gly Ser Ile Asp Ser Gly Ser Trp Thr Glu Ser Ser Pro
        130   135   140
Leu Glu Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Gly Ser Asp Leu
145   150   155   160
Val Ala Arg Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Ile Thr
                165   170   175
Arg Cys Cys Asn Asn Tyr Gly Pro Tyr Gln His Pro Glu Lys Leu Ile
                180   185   190
Pro Leu Phe Val Thr Asn Leu Leu Asp Gly Gly Thr Leu Pro Leu Tyr
            195   200   205
Gly Asp Gly Ala Asn Val Arg Glu Trp Val His Thr Asp Asp His Cys
        210   215   220
Arg Gly Ile Ala Leu Val Leu Ala Gly Gly Arg Ala Gly Glu Ile Tyr
225   230   235   240
His Ile Gly Gly Gly Leu Glu Leu Thr Asn Arg Glu Leu Thr Gly Ile
                245   250   255

66

```
Leu Leu Asp Ser Leu Gly Ala Asp Trp Ser Ser Val Arg Lys Val Ala
            260                 265                 270
Asp Arg Lys Gly His Asp Leu Arg Tyr Ser Leu Asp Gly Gly Glu Ile
            275                 280                 285
Glu Arg Glu Leu Gly Tyr Arg Pro Gln Val Ser Phe Ala Asp Gly Leu
    290                 295                 300
Ala Arg Thr Val Arg Trp Tyr Arg Glu Asn Arg Gly Trp Trp Glu Pro
305                 310                 315                 320
Leu Lys Ala Thr Ala Pro Gln Leu Pro Ala Thr Ala Val Glu Val Ser
            325                 330                 335
Ala
```

<210> 15
<211> 1140
<212> DNA
<213> Streptomyces venezuelae

<400> 15
```
gtgagcagcc gcgccgagac cccccgcgtc cccttcctcg acctcaaggc cgcctacgag    60
gagctccgcg cggagaccga cgccgcgatc gcccgcgtcc tcgactcggg gcgctacctc   120
ctcggacccg aactcgaagg attcgaggcg gagttcgccg cgtactgcga gacggaccac   180
gccgtcggcg tgaacagcgg gatggacgcc ctccagctcg ccctccgcgg cctcggcatc   240
ggacccgggg acgaggtgat cgtcccctcg cacacgtaca tcgccagctg gctcgcggtg   300
tccgccaccg gcgcgacccc cgtgcccgtc gagccgcacg aggaccaccc caccctggac   360
ccgctgctcg tcgagaaggc gatcacccccc cgcacccggg cgctcctccc cgtccacctc   420
tacgggcacc ccgccgacat ggacgccctc gcgagctcg cggaccggca cggcctgcac   480
atcgtcgagg acgccgcgca ggcccacggc gcccgctacc ggggccggcg gatcggcgcc   540
gggtcgtcgg tggccgcgtt cagcttctac ccgggcaaga acctcggctg cttcggcgac   600
ggcggcgccg tcgtcaccgg cgaccccgag ctcgccgaac ggctccggat gctccgcaac   660
tacggctcgc ggcagaagta cagccacgag acgaagggca ccaactcccg cctggacgag   720
atgcaggccg ccgtgctgcg gatccggctc gcccacctgg acagctggaa cggccgcagg   780
tcggcgctgg ccgcggagta cctctccggg ctcgccggac tgcccggcat cggcctgccg   840
gtgaccgcgc ccgacaccga cccggtctgg cacctcttca ccgtgcgcac cgagcgccgc   900
gacgagctgc gcagccacct cgacgcccgc ggcatcgaca ccctcacgca ctaccgggta   960
cccgtgcacc tctcgcccgc ctacgcgggc gaggcaccgc cggaaggctc gctcccgcgg  1020
gccgagagct cgcgcggca ggtcctcagc ctgccgatcg ccccgcacct ggagcgcccg  1080
caggcgctgc gggtgatcga cgccgtgcgc gaatgggccg agcgggtcga ccaggcctag  1140
```

<210> 16
<211> 379
<212> PRT
<213> Streptomyces venezuelae

<400> 16
```
Met Ser Ser Arg Ala Glu Thr Pro Arg Val Pro Phe Leu Asp Leu Lys
  1                 5                  10                  15
Ala Ala Tyr Glu Glu Leu Arg Ala Glu Thr Asp Ala Ala Ile Ala Arg
            20                  25                  30
Val Leu Asp Ser Gly Arg Tyr Leu Leu Gly Pro Glu Leu Glu Gly Phe
            35                  40                  45
Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val Gly Val
    50                  55                  60
Asn Ser Gly Met Asp Ala Leu Gln Leu Ala Leu Arg Gly Leu Gly Ile
65                  70                  75                  80
Gly Pro Gly Asp Glu Val Ile Val Pro Ser His Thr Tyr Ile Ala Ser
            85                  90                  95
Trp Leu Ala Val Ser Ala Thr Gly Ala Thr Pro Val Pro Val Glu Pro
            100                 105                 110
His Glu Asp His Pro Thr Leu Asp Pro Leu Leu Val Glu Lys Ala Ile
    115                 120                 125
```

67

```
Thr Pro Arg Thr Arg Ala Leu Leu Pro Val His Leu Tyr Gly His Pro
    130                 135                 140
Ala Asp Met Asp Ala Leu Arg Glu Leu Ala Asp Arg His Gly Leu His
145                 150                 155                 160
Ile Val Glu Asp Ala Ala Gln Ala His Gly Ala Arg Tyr Arg Gly Arg
                165                 170                 175
Arg Ile Gly Ala Gly Ser Ser Val Ala Ala Phe Ser Phe Tyr Pro Gly
                180                 185                 190
Lys Asn Leu Gly Cys Phe Gly Asp Gly Gly Ala Val Val Thr Gly Asp
                195                 200                 205
Pro Glu Leu Ala Glu Arg Leu Arg Met Leu Arg Asn Tyr Gly Ser Arg
    210                 215                 220
Gln Lys Tyr Ser His Glu Thr Lys Gly Thr Asn Ser Arg Leu Asp Glu
225                 230                 235                 240
Met Gln Ala Ala Val Leu Arg Ile Arg Leu Ala His Leu Asp Ser Trp
                245                 250                 255
Asn Gly Arg Arg Ser Ala Leu Ala Ala Glu Tyr Leu Ser Gly Leu Ala
                260                 265                 270
Gly Leu Pro Gly Ile Gly Leu Pro Val Thr Ala Pro Asp Thr Asp Pro
    275                 280                 285
Val Trp His Leu Phe Thr Val Arg Thr Glu Arg Arg Asp Glu Leu Arg
    290                 295                 300
Ser His Leu Asp Ala Arg Gly Ile Asp Thr Leu Thr His Tyr Pro Val
305                 310                 315                 320
Pro Val His Leu Ser Pro Ala Tyr Ala Gly Glu Ala Pro Pro Glu Gly
                325                 330                 335
Ser Leu Pro Arg Ala Glu Ser Phe Ala Arg Gln Val Leu Ser Leu Pro
                340                 345                 350
Ile Gly Pro His Leu Glu Arg Pro Gln Ala Leu Arg Val Ile Asp Ala
    355                 360                 365
Val Arg Glu Trp Ala Glu Arg Val Asp Gln Ala
    370                 375
```

<210> 17
<211> 714
<212> DNA
<213> Streptomyces venezuelae

<400> 17
```
gtgtacgaag tcgaccacgc cgacgtctac gacctcttct acctgggtcg cggcaaggac    60
tacgccgccg aggcctccga catcgccgac ctggtgcgct cccgtacccc cgaggcctcc   120
tcgctcctgg acgtggcctg cggtacgggc acgcatctgg agcacttcac caaggagttc   180
ggcgacaccg ccggcctgga gctgtccgag gacatgctca cccacgcccg caagcggctg   240
cccgacgcca cgctccacca gggcgacatg cgggacttcc ggctcggccg gaagttctcc   300
gccgtggtca gcatgttcag ctccgtcggc tacctgaaga cgaccgagga actcggcgcg   360
gccgtcgcct cgttcgcgga gcacctggag cccggtggcg tcgtcgtcgt cgagccgtgg   420
tggttcccgg agaccttcgc cgacggctgg gtcagcgccg acgtcgtccg ccgtgacggg   480
cgcaccgtgg cccgtgtctc gcactcggtg cgggagggga acgcgacgcg catggaggtc   540
cacttcaccg tggccgaccc gggcaagggc gtgcggcact tctccgacgt ccatctcatc   600
accctgttcc accaggccga gtacgaggcc gcgttcacgg ccgccgggct gcgcgtcgag   660
tacctggagg gcggcccgtc gggccgtggc ctcttcgtcg gcgtccccgc ctga          714
```

<210> 18
<211> 237
<212> PRT
<213> Streptomyces venezuelae

<400> 18
```
Met Tyr Glu Val Asp His Ala Asp Val Tyr Asp Leu Phe Tyr Leu Gly
1               5                   10                  15
Arg Gly Lys Asp Tyr Ala Ala Glu Ala Ser Asp Ile Ala Asp Leu Val
            20                  25                  30
```

```
Arg Ser Arg Thr Pro Glu Ala Ser Ser Leu Leu Asp Val Ala Cys Gly
        35                  40                  45
Thr Gly Thr His Leu Glu His Phe Thr Lys Glu Phe Gly Asp Thr Ala
    50                  55                  60
Gly Leu Glu Leu Ser Glu Asp Met Leu Thr His Ala Arg Lys Arg Leu
65                  70                  75                      80
Pro Asp Ala Thr Leu His Gln Gly Asp Met Arg Asp Phe Arg Leu Gly
                85                  90                  95
Arg Lys Phe Ser Ala Val Val Ser Met Phe Ser Ser Val Gly Tyr Leu
            100                 105                 110
Lys Thr Thr Glu Glu Leu Gly Ala Ala Val Ala Ser Phe Ala Glu His
        115                 120                 125
Leu Glu Pro Gly Gly Val Val Val Val Glu Pro Trp Trp Phe Pro Glu
    130                 135                 140
Thr Phe Ala Asp Gly Trp Val Ser Ala Asp Val Val Arg Arg Asp Gly
145                 150                 155                 160
Arg Thr Val Ala Arg Val Ser His Ser Val Arg Glu Gly Asn Ala Thr
                165                 170                 175
Arg Met Glu Val His Phe Thr Val Ala Asp Pro Gly Lys Gly Val Arg
            180                 185                 190
His Phe Ser Asp Val His Leu Ile Thr Leu Phe His Gln Ala Glu Tyr
        195                 200                 205
Glu Ala Ala Phe Thr Ala Ala Gly Leu Arg Val Glu Tyr Leu Glu Gly
    210                 215                 220
Gly Pro Ser Gly Arg Gly Leu Phe Val Gly Val Pro Ala
225                 230                 235
```

<210> 19
<211> 1281
<212> DNA
<213> Streptomyces venezuelae

<400> 19
```
atgcgcgtcc tgctgacctc gttcgcacat cacacgcact actacggcct ggtgcccctg      60
gcctgggcgc tgctcgccgc cgggcacgag gtgcgggtcg ccagccagcc cgcgctcacg     120
gacaccatca ccgggtccgg gctcgccgcg gtgccggtcg gcaccgacca cctcatccac     180
gagtaccggg tgcggatggc gggcgagccg cgcccgaacc atccggcgat cgccttcgac     240
gaggcccgtc ccgagccgct ggactgggac cacgccctcg gcatcgaggc gatcctcgcc     300
ccgtacttcc atctgctcgc caacaacgac tcgatggtcg acgacctcgt cgacttcgcc     360
cggtcctggc agccggacct ggtgctgtgg gagccgacga cctacgcggg cgccgtcgcc     420
gcccaggtca ccggtgccgc gcacgcccgg gtcctgtggg gcccgacgt gatgggcagc     480
gcccgccgca agttcgtcgc gctgcgggac cggcagccgc ccgagcaccg cgaggacccc     540
accgcggagt ggctgacgtg gacgctcgac cggtacggcg cctccttcga gaggagctg      600
ctcaccggcc agttcacgat cgacccgacc ccgccgagcc tgcgcctcga cacgggcctg     660
ccgaccgtcg ggatgcgtta tgttccgtac aacggcacgt cggtcgtgcc ggactggctg     720
agtgagccgc ccgcgcggcc ccgggtctgc ctgaccctcg gcgtctccgc gcgtgaggtc     780
ctcggcggcg acggcgtctc gcagggcgac atcctggagg cgctcgccga cctcgacatc     840
gagctcgtcg ccacgctcga cgcgagtcag cgcgccgaga tccgcaacta cccgaagcac     900
acccggttca cggacttcgt gccgatgcac gcgctcctgc cgagctgctc ggcgatcatc     960
caccacggcg gggcgggcac ctacgcgacc gccgtgatca cgcggtgcc gcaggtcatg    1020
ctcgccgagc tgtgggacgc gccggtcaag gcgcgggccg tcgccgagca ggggcggggg    1080
ttcttcctgc cgccggccga gctcacgccg caggccgtgc gggacgccgt cgtccgcatc    1140
ctcgacgacc cctcggtcgc caccgccgcg caccggctgc gcgaggagac cttcggcgac    1200
cccacccccgg ccgggatcgt ccccgagctg gagcggctcg ccgcgcagca ccgccgcccg    1260
ccggccgacg cccggcactg a                                             1281
```

<210> 20
<211> 426
<212> PRT
<213> Streptomyces venezuelae

<400> 20
```
Met Arg Val Leu Leu Thr Ser Phe Ala His His Thr His Tyr Tyr Gly
1               5                   10                  15
Leu Val Pro Leu Ala Trp Ala Leu Leu Ala Ala Gly His Glu Val Arg
            20                  25                  30
Val Ala Ser Gln Pro Ala Leu Thr Asp Thr Ile Thr Gly Ser Gly Leu
        35                  40                  45
Ala Ala Val Pro Val Gly Thr Asp His Leu Ile His Glu Tyr Arg Val
    50                  55                  60
Arg Met Ala Gly Glu Pro Arg Pro Asn His Pro Ala Ile Ala Phe Asp
65                  70                  75                  80
Glu Ala Arg Pro Glu Pro Leu Asp Trp Asp His Ala Leu Gly Ile Glu
            85                  90                  95
Ala Ile Leu Ala Pro Tyr Phe His Leu Leu Ala Asn Asn Asp Ser Met
            100                 105                 110
Val Asp Asp Leu Val Asp Phe Ala Arg Ser Trp Gln Pro Asp Leu Val
        115                 120                 125
Leu Trp Glu Pro Thr Thr Tyr Ala Gly Ala Val Ala Ala Gln Val Thr
    130                 135                 140
Gly Ala Ala His Ala Arg Val Leu Trp Gly Pro Asp Val Met Gly Ser
145                 150                 155                 160
Ala Arg Arg Lys Phe Val Ala Leu Arg Asp Arg Gln Pro Pro Glu His
            165                 170                 175
Arg Glu Asp Pro Thr Ala Glu Trp Leu Thr Trp Thr Leu Asp Arg Tyr
            180                 185                 190
Gly Ala Ser Phe Glu Glu Glu Leu Leu Thr Gly Gln Phe Thr Ile Asp
        195                 200                 205
Pro Thr Pro Pro Ser Leu Arg Leu Asp Thr Gly Leu Pro Thr Val Gly
    210                 215                 220
Met Arg Tyr Val Pro Tyr Asn Gly Thr Ser Val Val Pro Asp Trp Leu
225                 230                 235                 240
Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Leu Thr Leu Gly Val Ser
            245                 250                 255
Ala Arg Glu Val Leu Gly Gly Asp Gly Val Ser Gln Gly Asp Ile Leu
            260                 265                 270
Glu Ala Leu Ala Asp Leu Asp Ile Glu Leu Val Ala Thr Leu Asp Ala
        275                 280                 285
Ser Gln Arg Ala Glu Ile Arg Asn Tyr Pro Lys His Thr Arg Phe Thr
    290                 295                 300
Asp Phe Val Pro Met His Ala Leu Leu Pro Ser Cys Ser Ala Ile Ile
305                 310                 315                 320
His His Gly Gly Ala Gly Thr Tyr Ala Thr Ala Val Ile Asn Ala Val
            325                 330                 335
Pro Gln Val Met Leu Ala Glu Leu Trp Asp Ala Pro Val Lys Ala Arg
            340                 345                 350
Ala Val Ala Glu Gln Gly Ala Gly Phe Phe Leu Pro Pro Ala Glu Leu
        355                 360                 365
Thr Pro Gln Ala Val Arg Asp Ala Val Val Arg Ile Leu Asp Asp Pro
    370                 375                 380
Ser Val Ala Thr Ala Ala His Arg Leu Arg Glu Glu Thr Phe Gly Asp
385                 390                 395                 400
Pro Thr Pro Ala Gly Ile Val Pro Glu Leu Glu Arg Leu Ala Ala Gln
            405                 410                 415
His Arg Arg Pro Pro Ala Asp Ala Arg His
            420                 425
```

<210> 21
<211> 1209
<212> DNA
<213> Streptomyces venezuelae

70

<400> 21

```
gtgaccgacg acctgacggg ggccctcacg cagcccccgc tgggccgcac cgtccgcgcg        60
gtggccgacc gtgaactcgg cacccacctc ctggagaccc gcggcatcca ctggatccac       120
gccgcgaacg gcgacccgta cgccaccgtg ctgcgcggcc aggcggacga cccgtatccc       180
gcgtacgagc gggtgcgtgc ccgcggcgcg ctctccttca gcccgacggg cagctgggtc       240
accgccgatc acgccctggc ggcgagcatc ctctgctcga cggacttcgg ggtctccggc       300
gccgacggcg tcccggtgcc gcagcaggtc ctctcgtacg gggagggctg tccgctggag       360
cgcgagcagg tgctgccggc ggccggtgac gtgccggagg cgggcagcg tgccgtggtc        420
gaggggatcc accgggagac gctggaggt ctcgcgccgg acccgtcggc gtcgtacgcc        480
ttcgagctgc tgggcggttt cgtccgcccg gcggtgacgg ccgctgccgc cgccgtgctg       540
ggtgttcccg cggaccggcg cgcggacttc gcggatctgc tggagcggct ccggccgctg       600
tccgacagcc tgctggcccc gcagtccctg cggacggtac gggcggcgga cggcgcgctg       660
gccgagctca cggcgctgct cgccgattcg gacgactccc ccggggccct gctgtcggcg       720
ctcgggg tca ccgcagccgt ccagctcacc gggaacgcgg tgctcgcgct cctcgcgcat      780
cccgagcagt ggcgggagct gtgcgaccgg cccgggctcg cggcggccgc ggtggaggag       840
accctccgct acgacccgcc ggtgcagctc gacgcccggg tggtccgcgg ggagacggag       900
ctggcgggcc ggcggctgcc ggccggggcg catgtcgtcg tcctgaccgc cgcgaccggc       960
cgggacccgg aggtcttcac ggacccggag cgcttcgacc tcgcgcgccc cgacgccgcc      1020
gcgcacctcg cgctgcaccc cgccggtccg tacggcccgg tggcgtccct ggtccggctt      1080
caggcggagg tcgcgctgcg gaccctggcc gggcgtttcc ccgggctgcg gcaggcgggg      1140
gacgtgctcc gcccccgccg cgcgcctgtc ggccgcgggc cgctgagcgt cccggtcagc      1200
agctcctga                                                             1209
```

<210> 22
<211> 402
<212> PRT
<213> Streptomyces venezuelae

<400> 22

```
Met Thr Asp Asp Leu Thr Gly Ala Leu Thr Gln Pro Pro Leu Gly Arg
 1               5                  10                  15
Thr Val Arg Ala Val Ala Asp Arg Glu Leu Gly Thr His Leu Leu Glu
                20                  25                  30
Thr Arg Gly Ile His Trp Ile His Ala Ala Asn Gly Asp Pro Tyr Ala
            35                  40                  45
Thr Val Leu Arg Gly Gln Ala Asp Asp Pro Tyr Pro Ala Tyr Glu Arg
        50                  55                  60
Val Arg Ala Arg Gly Ala Leu Ser Phe Ser Pro Thr Gly Ser Trp Val
65                  70                  75                  80
Thr Ala Asp His Ala Leu Ala Ala Ser Ile Leu Cys Ser Thr Asp Phe
                85                  90                  95
Gly Val Ser Gly Ala Asp Gly Val Pro Val Pro Gln Gln Val Leu Ser
            100                 105                 110
Tyr Gly Glu Gly Cys Pro Leu Glu Arg Glu Gln Val Leu Pro Ala Ala
        115                 120                 125
Gly Asp Val Pro Glu Gly Gly Gln Arg Ala Val Val Glu Gly Ile His
    130                 135                 140
Arg Glu Thr Leu Glu Gly Leu Ala Pro Asp Pro Ser Ala Ser Tyr Ala
145                 150                 155                 160
Phe Glu Leu Leu Gly Gly Phe Val Arg Pro Ala Val Thr Ala Ala Ala
                165                 170                 175
Ala Ala Val Leu Gly Val Pro Ala Asp Arg Arg Ala Asp Phe Ala Asp
            180                 185                 190
Leu Leu Glu Arg Leu Arg Pro Leu Ser Asp Ser Leu Leu Ala Pro Gln
        195                 200                 205
Ser Leu Arg Thr Val Arg Ala Ala Asp Gly Ala Leu Ala Glu Leu Thr
    210                 215                 220
Ala Leu Leu Ala Asp Ser Asp Asp Ser Pro Gly Ala Leu Leu Ser Ala
225                 230                 235                 240
Leu Gly Val Thr Ala Ala Val Gln Leu Thr Gly Asn Ala Val Leu Ala
                245                 250                 255
```

71

```
Leu Leu Ala His Pro Glu Gln Trp Arg Glu Leu Cys Asp Arg Pro Gly
        260                 265                 270
Leu Ala Ala Ala Ala Val Glu Glu Thr Leu Arg Tyr Asp Pro Pro Val
        275                 280                 285
Gln Leu Asp Ala Arg Val Val Arg Gly Glu Thr Glu Leu Ala Gly Arg
    290                 295                 300
Arg Leu Pro Ala Gly Ala His Val Val Val Leu Thr Ala Ala Thr Gly
305                 310                 315                 320
Arg Asp Pro Glu Val Phe Thr Asp Pro Glu Arg Phe Asp Leu Ala Arg
                325                 330                 335
Pro Asp Ala Ala Ala His Leu Ala Leu His Pro Ala Gly Pro Tyr Gly
            340                 345                 350
Pro Val Ala Ser Leu Val Arg Leu Gln Ala Glu Val Ala Leu Arg Thr
        355                 360                 365
Leu Ala Gly Arg Phe Pro Gly Leu Arg Gln Ala Gly Asp Val Leu Arg
    370                 375                 380
Pro Arg Arg Ala Pro Val Gly Arg Gly Pro Leu Ser Val Pro Val Ser
385                 390                 395                 400
Ser Ser
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<210> 23
<211> 2430
<212> DNA
<213> Streptomyces venezuelae

<400> 23
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gtgacaggta agacccgaat accgcgtgtc cgccgcggcc gcaccacgcc cagggccttc    60
accctggccg tcgtcggcac cctgctggcg ggcaccaccg tggcggccgc cgctcccggc   120
gccgccgaca cggccaatgt tcagtacacg agccgggcgg cggagctcgt cgcccagatg   180
acgctcgacg agaagatcag cttcgtccac tgggcgctgg accccgaccg gcagaacgtc   240
ggctaccttc ccggcgtgcc gcgtctgggc atcccggagc tgcgtgccgc cgacggcccg   300
aacggcatcc gcctggtggg gcagaccgcc accgcgctgc ccgcgccggt cgccctggcc   360
agcaccttcg acgacaccat ggccgacagc tacggcaagg tcatgggccg cgacggtcgc   420
gcgctcaacc aggacatggt cctgggcccg atgatgaaca acatccgggt gccgcacggc   480
ggccggaact acgagacctt cagcgaggac cccctggtct cctcgcgcac cgcggtcgcc   540
cagatcaagg gcatccaggg tgcgggtctg atgaccacgg ccaagcactt cgcggccaac   600
aaccaggaga acaaccgctt ctccgtgaac gccaatgtcg acgagcagac gctccgcgag   660
atcgagttcc cggcgttcga ggcgtcctcc aaggccggcg cggcctcctt catgtgtgcc   720
tacaacggcc tcaacgggaa gccgtcctgc ggcaacgacg agctcctcaa caacgtgctg   780
cgcacgcagt ggggcttcca gggctgggtg atgtccgact ggctcgccac cccgggcacc   840
gacgccatca ccaagggcct cgaccaggag atgggcgtcg agctccccgg cgacgtcccg   900
aagggcgagc cctcgccgcc ggccaagttc ttcggcgagg cgctgaagac ggccgtcctg   960
aacggcacgg tccccgaggc ggccgtgacg cggtcggcgg agcggatcgt cggccagatg  1020
gagaagttcg tctgctcct cgccactccg gcgccgcggc ccgagcgcga caaggcgggt  1080
gcccaggcgg tgtcccgcaa ggtcgccgag aacggcgcgg tgctcctgcg caacgagggc  1140
caggccctgc cgctcgccgg tgacgccggc aagagcatcg cggtcatcgg cccgacggcc  1200
gtcgacccca aggtcaccgg cctgggcagc gcccacgtcg tcccggactc ggcggcggcg  1260
ccactcgaca ccatcaaggc ccgcgcgggt gcgggtgcga cggtgacgta cgagacgggt  1320
gaggagacct cgggacgca gatcccggcg gggaacctca gcccggcgtt caaccagggc  1380
caccagctcg agccgggcaa ggcggggggcg ctgtacgacg gcacgctgac cgtgcccgcc  1440
gacggcgagt accgcatcgc ggtccgtgcc accggtggtt acgccacggt gcagctcggc  1500
agccacacca tcgaggccgg tcaggtctac ggcaaggtga gcagcccgct cctcaagctg  1560
accaagggca cgcacaagct cacgatctcg ggcttcgcga tgagtgccac cccgctctcc  1620
ctggagctgg gctgggtgac gccggcggcg gccgacgcga cgatcgcgaa ggccgtggag  1680
tcggcgcgga aggcccgtac ggcggtcgtc ttcgcctacg acgacggcac cgagggcgtc  1740
gaccgtccga acctgtcgct gccgggtacg caggacaagc tgatctcggc tgtcgcggac  1800
gccaacccga acacgatcgt ggtcctcaac accggttcgt cggtgctgat gccgtggctg  1860
tccaagaccc gcgcggtcct ggacatgtgg tacccgggcc aggcgggcgc cgaggccacc  1920
gccgcgctgc tctacggtga cgtcaacccg agcggcaagc tcacgcagag cttccccggcc  1980
gccgagaacc agcacgcggt cgccggcgac ccgacaagct acccgggcgt cgacaaccag  2040
cagacgtacc gcgagggcat ccacgtcggg taccgctggt tcgacaagga gaacgtcaag  2100
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```
                                    72
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ccgctgttcc cgttcgggca cggcctgtcg tacacctcgt tcacgcagag cgccccgacc   2160
gtcgtgcgta cgtccacggg tggtctgaag gtcacggtca cggtccgcaa cagcgggaag   2220
cgcgccggcc aggaggtcgt ccaggcgtac ctcggtgcca gcccgaacgt gacggctccg   2280
caggcgaaga agaagctcgt gggctacacg aaggtctcgc tcgccgcggg cgaggcgaag   2340
acggtgacgg tgaacgtcga ccgccgtcag ctgcagaccg ttcgtcctc cgccgacctg   2400
cggggcagcg ccacggtcaa cgtctggtga                                     2430
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<210> 24
<211> 809
<212> PRT
<213> Streptomyces venezuelae

<400> 24

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Met Thr Gly Lys Thr Arg Ile Pro Arg Val Arg Arg Gly Arg Thr Thr
 1               5                  10                  15
Pro Arg Ala Phe Thr Leu Ala Val Val Gly Thr Leu Leu Ala Gly Thr
            20                  25                  30
Thr Val Ala Ala Ala Ala Pro Gly Ala Ala Asp Thr Ala Asn Val Gln
        35                  40                  45
Tyr Thr Ser Arg Ala Ala Glu Leu Val Ala Gln Met Thr Leu Asp Glu
    50                  55                  60
Lys Ile Ser Phe Val His Trp Ala Leu Asp Pro Asp Arg Gln Asn Val
65                  70                  75                  80
Gly Tyr Leu Pro Gly Val Pro Arg Leu Gly Ile Pro Glu Leu Arg Ala
                85                  90                  95
Ala Asp Gly Pro Asn Gly Ile Arg Leu Val Gly Gln Thr Ala Thr Ala
            100                 105                 110
Leu Pro Ala Pro Val Ala Leu Ala Ser Thr Phe Asp Asp Thr Met Ala
        115                 120                 125
Asp Ser Tyr Gly Lys Val Met Gly Arg Asp Gly Arg Ala Leu Asn Gln
    130                 135                 140
Asp Met Val Leu Gly Pro Met Met Asn Asn Ile Arg Val Pro His Gly
145                 150                 155                 160
Gly Arg Asn Tyr Glu Thr Phe Ser Glu Asp Pro Leu Val Ser Ser Arg
                165                 170                 175
Thr Ala Val Ala Gln Ile Lys Gly Ile Gln Gly Ala Gly Leu Met Thr
            180                 185                 190
Thr Ala Lys His Phe Ala Ala Asn Asn Gln Glu Asn Asn Arg Phe Ser
        195                 200                 205
Val Asn Ala Asn Val Asp Glu Gln Thr Leu Arg Glu Ile Glu Phe Pro
    210                 215                 220
Ala Phe Glu Ala Ser Ser Lys Ala Gly Ala Ala Ser Phe Met Cys Ala
225                 230                 235                 240
Tyr Asn Gly Leu Asn Gly Lys Pro Ser Cys Gly Asn Asp Glu Leu Leu
                245                 250                 255
Asn Asn Val Leu Arg Thr Gln Trp Gly Phe Gln Gly Trp Val Met Ser
            260                 265                 270
Asp Trp Leu Ala Thr Pro Gly Thr Asp Ala Ile Thr Lys Gly Leu Asp
        275                 280                 285
Gln Glu Met Gly Val Glu Leu Pro Gly Asp Val Pro Lys Gly Glu Pro
    290                 295                 300
Ser Pro Pro Ala Lys Phe Phe Gly Glu Ala Leu Lys Thr Ala Val Leu
305                 310                 315                 320
Asn Gly Thr Val Pro Glu Ala Ala Val Thr Arg Ser Ala Glu Arg Ile
                325                 330                 335
Val Gly Gln Met Glu Lys Phe Gly Leu Leu Leu Ala Thr Pro Ala Pro
            340                 345                 350
Arg Pro Glu Arg Asp Lys Ala Gly Ala Gln Ala Val Ser Arg Lys Val
        355                 360                 365
Ala Glu Asn Gly Ala Val Leu Leu Arg Asn Glu Gly Gln Ala Leu Pro
    370                 375                 380
```

```
Leu Ala Gly Asp Ala Gly Lys Ser Ile Ala Val Ile Gly Pro Thr Ala
385                 390                 395                 400
Val Asp Pro Lys Val Thr Gly Leu Gly Ser Ala His Val Val Pro Asp
            405                 410                 415
Ser Ala Ala Ala Pro Leu Asp Thr Ile Lys Ala Arg Ala Gly Ala Gly
            420                 425                 430
Ala Thr Val Thr Tyr Glu Thr Gly Glu Glu Thr Phe Gly Thr Gln Ile
        435                 440                 445
Pro Ala Gly Asn Leu Ser Pro Ala Phe Asn Gln Gly His Gln Leu Glu
    450                 455                 460
Pro Gly Lys Ala Gly Ala Leu Tyr Asp Gly Thr Leu Thr Val Pro Ala
465                 470                 475                 480
Asp Gly Glu Tyr Arg Ile Ala Val Arg Ala Thr Gly Gly Tyr Ala Thr
            485                 490                 495
Val Gln Leu Gly Ser His Thr Ile Glu Ala Gly Gln Val Tyr Gly Lys
            500                 505                 510
Val Ser Ser Pro Leu Leu Lys Leu Thr Lys Gly Thr His Lys Leu Thr
            515                 520                 525
Ile Ser Gly Phe Ala Met Ser Ala Thr Pro Leu Ser Leu Glu Leu Gly
    530                 535                 540
Trp Val Thr Pro Ala Ala Ala Asp Ala Thr Ile Ala Lys Ala Val Glu
545                 550                 555                 560
Ser Ala Arg Lys Ala Arg Thr Ala Val Val Phe Ala Tyr Asp Asp Gly
            565                 570                 575
Thr Glu Gly Val Asp Arg Pro Asn Leu Ser Leu Pro Gly Thr Gln Asp
            580                 585                 590
Lys Leu Ile Ser Ala Val Ala Asp Ala Asn Pro Asn Thr Ile Val Val
            595                 600                 605
Leu Asn Thr Gly Ser Ser Val Leu Met Pro Trp Leu Ser Lys Thr Arg
    610                 615                 620
Ala Val Leu Asp Met Trp Tyr Pro Gly Gln Ala Gly Ala Glu Ala Thr
625                 630                 635                 640
Ala Ala Leu Leu Tyr Gly Asp Val Asn Pro Ser Gly Lys Leu Thr Gln
            645                 650                 655
Ser Phe Pro Ala Ala Glu Asn Gln His Ala Val Ala Gly Asp Pro Thr
            660                 665                 670
Ser Tyr Pro Gly Val Asp Asn Gln Gln Thr Tyr Arg Glu Gly Ile His
            675                 680                 685
Val Gly Tyr Arg Trp Phe Asp Lys Glu Asn Val Lys Pro Leu Phe Pro
    690                 695                 700
Phe Gly His Gly Leu Ser Tyr Thr Ser Phe Thr Gln Ser Ala Pro Thr
705                 710                 715                 720
Val Val Arg Thr Ser Thr Gly Gly Leu Lys Val Thr Val Thr Val Arg
            725                 730                 735
Asn Ser Gly Lys Arg Ala Gly Gln Glu Val Val Gln Ala Tyr Leu Gly
            740                 745                 750
Ala Ser Pro Asn Val Thr Ala Pro Gln Ala Lys Lys Lys Leu Val Gly
            755                 760                 765
Tyr Thr Lys Val Ser Leu Ala Ala Gly Glu Ala Lys Thr Val Thr Val
    770                 775                 780
Asn Val Asp Arg Arg Gln Leu Gln Thr Gly Ser Ser Ser Ala Asp Leu
785                 790                 795                 800
Arg Gly Ser Ala Thr Val Asn Val Trp
            805
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<210> 25
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> A synthetic consensus sequence.

74

<220>
<221> VARIANT
<222> (4)...(4)
<223> Residue 4 is either V or I.

<400> 25
Leu Leu Asp Val Ala Cys Gly Thr Gly
 1   5

<210> 26
<211> 1011
<212> DNA
<213> Streptomyces venezuelae

<400> 26
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ggccagaact tccttcagga cgacagagcc gtgcgcaatc tcgtcacgca tgtcgagggg   120
gacggtagga acgttctcga aatcggcccc ggaaagggcg cgataaccga ggagttggtg   180
cgctccttcg acaccgtgac ggtcgtggag atggacccgc actgggccgc gcatgtgcgg   240
cggaaattcg aaggggagag ggtcaccgta ttccagggtg atttcctcga cttccgcatt   300
ccgcgcgata tcgacaccgt cgtcggaaac gttcccttcg gcatcacgac ccagattctc   360
cggagtctcc tggaatcgac gaactggcag tcggcggccc tgatagtgca gtgggaggtc   420
gcccgcaaac gcgccggtcg cagcggcgga tcgctcctca cgacctcctg gcccccctgg   480
tacgagttcg cggtccacga ccgcgtccgc gcctcgtcgt tccgtccgat gccccgcgtc   540
gacggcggcg tcctgacgat caggcgacgc ccccagcccc tgctgcccga gagcgcgagc   600
cgcgccttcc agaacttcgc cgaagccgtc ttcaccggcc ccggacgggg cctcgcggag   660
atcctccggc gccacatccc caagcggacc taccgttccc tcgccgaccg ccacggaatt   720
ccggacggcg gactgccgaa ggacctcacg ctcacccaat ggatcgccct tttccaggcc   780
tcccagccga gttacgcgcc ggggggcgccc ggcacgcgca tgccggccca gggcggtggc   840
gccggcggca gggactatga ctcggagacg agcagggccg ccgtgcccgg gagccgcaga   900
tacggcccca cgcgcggcgg cgaaccctgc gcaccccgcg cacaggtccg gcagaccaag   960
ggccgccagg gcgcgcgagg ctcgtcgtac ggacgccgca cgggccgtta g   1011

<210> 27
<211> 336
<212> PRT
<213> Streptomyces venezuelae

<400> 27
Met Ala Met Arg Asp Ser Ile Pro Arg Arg Ala Asp Arg Asp Thr Leu
 1   5   10   15
Arg Arg Glu Leu Gly Gln Asn Phe Leu Gln Asp Asp Arg Ala Val Arg
            20   25   30
Asn Leu Val Thr His Val Glu Gly Asp Gly Arg Asn Val Leu Glu Ile
        35   40   45
Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser Phe Asp
    50   55   60
Thr Val Thr Val Val Glu Met Asp Pro His Trp Ala Ala His Val Arg
65   70   75   80
Arg Lys Phe Glu Gly Glu Arg Val Thr Val Phe Gln Gly Asp Phe Leu
                85   90   95
Asp Phe Arg Ile Pro Arg Asp Ile Asp Thr Val Val Gly Asn Val Pro
                100   105   110
Phe Gly Ile Thr Thr Gln Ile Leu Arg Ser Leu Leu Glu Ser Thr Asn
            115   120   125
Trp Gln Ser Ala Ala Leu Ile Val Gln Trp Glu Val Ala Arg Lys Arg
    130   135   140
Ala Gly Arg Ser Gly Gly Ser Leu Leu Thr Thr Ser Trp Ala Pro Trp
145   150   155   160
Tyr Glu Phe Ala Val His Asp Arg Val Arg Ala Ser Ser Phe Arg Pro
                165   170   175

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Met Pro Arg Val Asp Gly Gly Val Leu Thr Ile Arg Arg Arg Pro Gln
        180                     185                 190
Pro Leu Leu Pro Glu Ser Ala Ser Arg Ala Phe Gln Asn Phe Ala Glu
        195                     200                 205
Ala Val Phe Thr Gly Pro Gly Arg Gly Leu Ala Glu Ile Leu Arg Arg
        210                     215                 220
His Ile Pro Lys Arg Thr Tyr Arg Ser Leu Ala Asp Arg His Gly Ile
225                     230                 235                 240
Pro Asp Gly Gly Leu Pro Lys Asp Leu Thr Leu Thr Gln Trp Ile Ala
                245                 250                 255
Leu Phe Gln Ala Ser Gln Pro Ser Tyr Ala Pro Gly Ala Pro Gly Thr
            260                 265                 270
Arg Met Pro Gly Gln Gly Gly Gly Ala Gly Gly Arg Asp Tyr Asp Ser
        275                 280                 285
Glu Thr Ser Arg Ala Ala Val Pro Gly Ser Arg Arg Tyr Gly Pro Thr
        290                 295                 300
Arg Gly Gly Glu Pro Cys Ala Pro Arg Ala Gln Val Arg Gln Thr Lys
305                 310                 315                 320
Gly Arg Gln Gly Ala Arg Gly Ser Ser Tyr Gly Arg Arg Thr Gly Arg
                325                 330                 335

<210> 28
<211> 969
<212> DNA
<213> Streptomyces venezuelae

<400> 28
atggcatttt ccccgcaggg cggccgacac gagctcggtc agaacttcct cgtcgaccgg      60
tcagtgatcg acgagatcga cggcctggtg gccaggacca agggtccgat actggagatc     120
ggtccgggtg acggcgccct gaccctgccg ctgagcaggc acggcaggcc gatcaccgcc     180
gtcgagctcg acggccggcg cgcgcagcgc ctcggtgccc gcacccccgg tcatgtgacc     240
gtggtgcacc acgacttcct gcagtacccg ctgccgcgca acccgcatgt ggtcgtcggc     300
aacgtcccct tccatctgac gacggcgatc atgcggcggc tgctcgacgc ccagcactgg     360
cacaccgccg tcctcctcgt ccagtgggag gtcgcccggc gccgggccgg cgtcggcggg     420
tcgacgctgc tgacggccgg ctgggcgccc tggtacgagt tcgacctgca ctcccgggtc     480
cccgcgcggg ccttccgtcc gatgccgggc gtggacggag gagtactggc catccggcgg     540
cggtccgcgc cgctcgtggg ccaggtgaag acgtaccagg acttcgtacg ccaggtgttc     600
accggcaagg ggaacgggct gaaggagatc ctgcggcgga ccgggcggat ctcgcagcgg     660
gacctggcga cctggctgcg gaggaacgag atctcgccgc acgcgctgcc caaggacctg     720
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gacggtacgg cgggcggtgg cgcggccgga tcgcacgggg cggctcgggt cggggccggt     840
cacccgggcg gccgggtgtc cgcgagccgg cggggcgtgc cgcaggcgcg cgcggccgg      900
gggcatgcgg tacggagctc cacggggacc gagccgaggt ggggcagggg gcgggcggag     960
agcgcgtga                                                            969

<210> 29
<211> 322
<212> PRT
<213> Streptomyces venezuelae

<400> 29
Met Ala Phe Ser Pro Gln Gly Gly Arg His Glu Leu Gly Gln Asn Phe
1               5                   10                  15
Leu Val Asp Arg Ser Val Ile Asp Glu Ile Asp Gly Leu Val Ala Arg
            20                  25                  30
Thr Lys Gly Pro Ile Leu Glu Ile Gly Pro Gly Asp Gly Ala Leu Thr
            35                  40                  45
Leu Pro Leu Ser Arg His Gly Arg Pro Ile Thr Ala Val Glu Leu Asp
        50                  55                  60
Gly Arg Arg Ala Gln Arg Leu Gly Ala Arg Thr Pro Gly His Val Thr
65                  70                  75                  80
```

76

```
Val Val His His Asp Phe Leu Gln Tyr Pro Leu Pro Arg Asn Pro His
            85                      90                      95
Val Val Val Gly Asn Val Pro Phe His Leu Thr Thr Ala Ile Met Arg
        100                     105                     110
Arg Leu Leu Asp Ala Gln His Trp His Thr Ala Val Leu Leu Val Gln
        115                     120                     125
Trp Glu Val Ala Arg Arg Arg Ala Gly Val Gly Gly Ser Thr Leu Leu
        130                     135                     140
Thr Ala Gly Trp Ala Pro Trp Tyr Glu Phe Asp Leu His Ser Arg Val
145                     150                     155                     160
Pro Ala Arg Ala Phe Arg Pro Met Pro Gly Val Asp Gly Gly Val Leu
                165                     170                     175
Ala Ile Arg Arg Arg Ser Ala Pro Leu Val Gly Gln Val Lys Thr Tyr
                180                     185                     190
Gln Asp Phe Val Arg Gln Val Phe Thr Gly Lys Gly Asn Gly Leu Lys
            195                     200                     205
Glu Ile Leu Arg Arg Thr Gly Arg Ile Ser Gln Arg Asp Leu Ala Thr
    210                     215                     220
Trp Leu Arg Arg Asn Glu Ile Ser Pro His Ala Leu Pro Lys Asp Leu
225                     230                     235                     240
Lys Pro Gly Gln Trp Ala Ser Leu Trp Glu Leu Thr Gly Gly Thr Ala
                245                     250                     255
Asp Gly Ser Phe Asp Gly Thr Ala Gly Gly Gly Ala Ala Gly Ser His
                260                     265                     270
Gly Ala Ala Arg Val Gly Ala Gly His Pro Gly Gly Arg Val Ser Ala
                275                     280                     285
Ser Arg Arg Gly Val Pro Gln Ala Arg Arg Gly Arg Gly His Ala Val
    290                     295                     300
Arg Ser Ser Thr Gly Thr Glu Pro Arg Trp Gly Arg Gly Arg Ala Glu
305                     310                     315                     320
Ser Ala
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<210> 30
<211> 13842
<212> DNA
<213> Streptomyces venezuelae

<400> 30
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gcagcgtggg acacggggga agtgcgggtc cgacgggggt tgcccctgc cggccccgat         120
catgcggagc actccttctc tcgtgctcct accggtgatg tgcgcgccga attgattcgt         180
ggagagatgt cgacagtgtc caagagtgag tccgaggaat tcgtgtccgt gtcgaacgac         240
gccggttccg cgcacggcac agcggaaccc gtcgccgtcg tcggcatctc ctgccgggtg         300
cccggcgccc gggacccgag agagttctgg gaactcctgg cggcaggcgg ccaggccgtc         360
accgacgtcc ccgcggaccg ctggaacgcc ggcgacttct acgacccgga ccgctccgcc         420
cccggccgct cgaacagccg gtggggcggg ttcatcgagg acgtcgaccg gttcgacgcc         480
gccttcttcg gcatctcgcc ccgcgaggcc gcggagatgg acccgcagca gcggctcgcc         540
ctggagctgg gctgggaggc cctggagcgc gccgggatcg acccgtcctc gctcaccggc         600
acccgcaccg gcgtcttcgc cggcgccatc tgggacgact acgccaccct gaagcaccgc         660
cagggcggcg ccgcgatcac cccgcacacc gtcaccggcc tccaccgcgg catcatcgcg         720
aaccgactct cgtacacgct cgggctccgc ggccccagca tggtcgtcga ctccggccag         780
tcctcgtcgc tcgtcgccgt ccacctcgcg tgcgagagcc tgcggcgcgg cgagtccgag         840
ctcgcccctcg ccggcggcgt ctcgctcaac ctggtgccgg acagcatcat cggggcgagc         900
aagttcggcg gcctctcccc cgacggccgc gcctacacct tcgacgcgcg cgccaacggc         960
tacgtacgcg gcgagggcgg cggtttcgtc gtcctgaagc gcctctcccg ggccgtcgcc        1020
gacggcgacc cggtgctcgc cgtgatccgg ggcagcgccg tcaacaacgg cggcgccgcc        1080
cagggcatga cgaccccccga cgcgcaggcg caggaggccg tgctccgcga ggcccacgag        1140
cgggccggga ccgcgccggc cgacgtgcgg tacgtcgagc tgcacggcac cggcaccccc        1200
gtgggcgacc cgatcgaggc cgctgcgctc ggcgccgccc tcggcaccgg ccgcccggcc        1260
ggacagccgc tcctggtcgg ctcggtcaag acgaacatcg gccacctgga gggcgcggcc        1320
ggcatcgccg gcctcatcaa ggccgtcctg gcggtccgcg gtcgcgcgct gccggccagc        1380
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77

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ctgaactacg agaccccgaa cccggcgatc ccgttcgagg aactgaacct ccgggtgaac    1440
acggagtacc tgccgtggga gccggagcac gacgggcagc ggatggtcgt cggcgtgtcc    1500
tcgttcggca tgggcggcac gaacgcgcat gtcgtgctcg aagaggcccc cggggggttgt    1560
cgaggtgctt cggtcgtgga gtcgacggtc ggcgggtcgg cggtcggcgg cggtgtggtg    1620
ccgtgggtgg tgtcggcgaa gtccgctgcc gcgctggacg cgcagatcga gcggcttgcc    1680
gcgttcgcct cgcgggatcg tacggatggt gtcgacgcgg gcgctgtcga tgcgggtgct    1740
gtcgatgcgg gtgctgtcgc tcgcgtactg gccggcgggc gtgctcagtt cgagcaccgg    1800
gccgtcgtcg tcggcagcgg gccggacgat ctggcggcag cgctggccgc gcctgagggt    1860
ctggtccggg gcgtggcttc cggtgtcggg cgagtggcgt tcgtgttccc cgggcagggc    1920
acgcagtggg ccggcatggg tgccgaactg ctggactctt ccgcggtgtt cgcggcggcc    1980
atggccgaat gcgaggccgc actctccccg tacgtcgact ggtcgctgga ggccgtcgta    2040
cggcaggccc ccggtgcgcc cacgctggag cgggtcgatg tcgtgcagcc tgtgacgttc    2100
gccgtcatgg tctcgctggc tcgcgtgtgg cagcaccacg gggtgacgcc ccaggcggtc    2160
gtcggccact cgcagggcga gatcgccgcc gcgtacgtcg ccggtgccct gagcctggac    2220
gacgccgctc gtgtcgtgac cctgcgcagc aagtccatcg ccgcccacct cgccggcaag    2280
ggcggcatgc tgtccctcgc gctgagcgag gacgccgtcc tggagcgact ggccgggttc    2340
gacgggctgt ccgtcgccgc tgtgaacggg cccaccgcca ccgtggtctc cggtgacccc    2400
gtacagatcg aagagcttgc tcgggcgtgt gaggccgatg gggtccgtgc gcgggtcatt    2460
cccgtcgact acgcgtccca cagccggcag gtcgagatca tcgagagcga gctcgccgag    2520
gtcctcgccg ggctcagccc gcaggctccg cgcgtgccgt tcttctcgac actcgaaggc    2580
gcctggatca ccgagcccgt gctcgacggc ggctactggt accgcaacct gcgccatcgt    2640
gtgggcttcg ccccggccgt cgagaccctg gccaccgacg agggcttcac ccacttcgtc    2700
gaggtcagcg cccaccccgt cctcaccatg gccctccccg ggaccgtcac cggtctggcg    2760
accctgcgtc gcgacaacgg cggtcaggac cgcctagtcg cctccctcgc cgaagcatgg    2820
gccaacggac tcgcggtcga ctggagcccg ctcctcccct ccgcgaccgg ccaccactcc    2880
gacctcccca cctacgcgtt ccagaccgag cgccactggc tgggcgagat cgaggcgctc    2940
gccccggcgg gcgagccggc ggtgcagccc gccgtcctcc gcacggaggc ggccgagccg    3000
gcggagctcg accgggacga gcagctgcgc gtgatcctgg acaaggtccg ggcgcagacg    3060
gcccaggtgc tggggtacgc gacaggcggg cagatcgagg tcgaccggac cttccgtgag    3120
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gtacggatgg cgccgtccat gatcttcgac ttccccaccc ccgaggctct cgcggagcag    3240
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Ala Pro Thr Gly Asp Val Arg Ala Glu Leu Ile Arg Gly Glu Met Ser
        50                  55                  60
Thr Val Ser Lys Ser Glu Ser Glu Glu Phe Val Ser Val Ser Asn Asp
65                  70                  75                  80
Ala Gly Ser Ala His Gly Thr Ala Glu Pro Val Ala Val Val Gly Ile
                85                  90                  95
Ser Cys Arg Val Pro Gly Ala Arg Asp Pro Arg Glu Phe Trp Glu Leu
            100                 105                 110
Leu Ala Ala Gly Gly Gln Ala Val Thr Asp Val Pro Ala Asp Arg Trp
        115                 120                 125
Asn Ala Gly Asp Phe Tyr Asp Pro Asp Arg Ser Ala Pro Gly Arg Ser
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145                 150                 155                 160
Ala Phe Phe Gly Ile Ser Pro Arg Glu Ala Ala Glu Met Asp Pro Gln
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Gln Arg Leu Ala Leu Glu Leu Gly Trp Glu Ala Leu Glu Arg Ala Gly
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Ile Asp Pro Ser Ser Leu Thr Gly Thr Arg Thr Gly Val Phe Ala Gly
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Ala Ile Thr Pro His Thr Val Thr Gly Leu His Arg Gly Ile Ile Ala
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81

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Leu Ser Pro Asp Gly Arg Ala Tyr Thr Phe Asp Ala Arg Ala Asn Gly
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Tyr Val Arg Gly Glu Gly Gly Gly Phe Val Val Leu Lys Arg Leu Ser
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705                 710                 715                 720
Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala
            725                 730                 735
```

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Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser
        740                 745                 750
Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Leu Ser Leu Ala Leu
        755                 760                 765
Ser Glu Asp Ala Val Leu Glu Arg Leu Ala Gly Phe Asp Gly Leu Ser
    770                 775                 780
Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro
785                 790                 795                 800
Val Gln Ile Glu Glu Leu Ala Arg Ala Cys Glu Ala Asp Gly Val Arg
            805                 810                 815
Ala Arg Val Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu
            820                 825                 830
Ile Ile Glu Ser Glu Leu Ala Glu Val Leu Ala Gly Leu Ser Pro Gln
        835                 840                 845
Ala Pro Arg Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp Ile Thr
    850                 855                 860
Glu Pro Val Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg His Arg
865                 870                 875                 880
Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu Gly Phe
            885                 890                 895
Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met Ala Leu
            900                 905                 910
Pro Gly Thr Val Thr Gly Leu Ala Thr Leu Arg Arg Asp Asn Gly Gly
        915                 920                 925
Gln Asp Arg Leu Val Ala Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu
        930                 935                 940
Ala Val Asp Trp Ser Pro Leu Leu Pro Ser Ala Thr Gly His His Ser
945                 950                 955                 960
Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg His Trp Leu Gly Glu
            965                 970                 975
Ile Glu Ala Leu Ala Pro Ala Gly Glu Pro Ala Val Gln Pro Ala Val
            980                 985                 990
Leu Arg Thr Glu Ala Ala Glu Pro Ala Glu Leu Asp Arg Asp Glu Gln
        995                 1000                1005
Leu Arg Val Ile Leu Asp Lys Val Arg Ala Gln Thr Ala Gln Val Leu
    1010                1015                1020
Gly Tyr Ala Thr Gly Gly Gln Ile Glu Val Asp Arg Thr Phe Arg Glu
1025                1030                1035                1040
Ala Gly Cys Thr Ser Leu Thr Gly Val Asp Leu Arg Asn Arg Ile Asn
            1045                1050                1055
Ala Ala Phe Gly Val Arg Met Ala Pro Ser Met Ile Phe Asp Phe Pro
            1060                1065                1070
Thr Pro Glu Ala Leu Ala Glu Gln Leu Leu Leu Val Val His Gly Glu
        1075                1080                1085
Ala Ala Ala Asn Pro Ala Gly Ala Glu Pro Ala Pro Val Ala Ala Ala
    1090                1095                1100
Gly Ala Val Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu
1105                1110                1115                1120
Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Gly
            1125                1130                1135
Gly Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val
            1140                1145                1150
Glu Gly Leu Tyr His Pro Asp Pro Glu His Pro Gly Thr Ser Tyr Val
            1155                1160                1165
Arg Gln Gly Gly Phe Ile Glu Asn Val Ala Gly Phe Asp Ala Ala Phe
        1170                1175                1180
Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg
1185                1190                1195                1200
Leu Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly Ile Asp
            1205                1210                1215
Pro Thr Ser Leu Arg Gly Arg Gln Val Gly Val Phe Thr Gly Ala Met
        1220                1225                1230
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Thr His Glu Tyr Gly Pro Ser Leu Arg Asp Gly Gly Glu Gly Leu Asp
        1235                1240                1245
Gly Tyr Leu Leu Thr Gly Asn Thr Ala Ser Val Met Ser Gly Arg Val
        1250                1255                1260
Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala Leu Thr Val Asp Thr Ala
1265                1270                1275                1280
Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala Leu Arg
            1285                1290                1295
Lys Gly Glu Val Asp Met Ala Leu Ala Gly Gly Val Ala Val Met Pro
        1300                1305                1310
Thr Pro Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Gly
        1315                1320                1325
Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser Ala Asp Gly Thr Ser Trp
        1330                1335                1340
Ser Glu Gly Val Gly Val Leu Leu Val Glu Arg Leu Ser Asp Ala Arg
1345                1350                1355                1360
Arg Asn Gly His Gln Val Leu Ala Val Val Arg Gly Ser Ala Leu Asn
            1365                1370                1375
Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln
        1380                1385                1390
Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Thr Thr Ser
        1395                1400                1405
Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp
        1410                1415                1420
Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly Arg Asp
1425                1430                1435                1440
Asp Glu Gln Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Ile Gly His
            1445                1450                1455
Thr Gln Ala Ala Ala Gly Val Ser Gly Val Ile Lys Met Val Gln Ala
        1460                1465                1470
Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu Pro Ser
        1475                1480                1485
Asp Gln Ile Asp Trp Ser Ala Gly Ala Val Glu Leu Leu Thr Glu Ala
        1490                1495                1500
Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala Ala Val
1505                1510                1515                1520
Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu Glu Glu
            1525                1530                1535
Ala Pro Val Val Val Glu Gly Ala Ser Val Val Glu Pro Ser Val Gly
            1540                1545                1550
Gly Ser Ala Val Gly Gly Gly Val Thr Pro Trp Val Val Ser Ala Lys
        1555                1560                1565
Ser Ala Ala Ala Leu Asp Ala Gln Ile Glu Arg Leu Ala Ala Phe Ala
1570                1575                1580
Ser Arg Asp Arg Thr Asp Asp Ala Asp Ala Gly Ala Val Asp Ala Gly
1585                1590                1595                1600
Ala Val Ala His Val Leu Ala Asp Gly Arg Ala Gln Phe Glu His Arg
            1605                1610                1615
Ala Val Ala Leu Gly Ala Gly Ala Asp Asp Leu Val Gln Ala Leu Ala
        1620                1625                1630
Asp Pro Asp Gly Leu Ile Arg Gly Thr Ala Ser Gly Val Gly Arg Val
        1635                1640                1645
Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala
        1650                1655                1660
Glu Leu Leu Asp Ser Ser Ala Val Phe Ala Ala Ala Met Ala Glu Cys
1665                1670                1675                1680
Glu Ala Ala Leu Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val
            1685                1690                1695
Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp Val Val Gln
        1700                1705                1710
Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Arg Val Trp Gln His
        1715                1720                1725
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His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln Gly Glu Ile
    1730                1735                1740
Ala Ala Ala Tyr Val Ala Gly Ala Leu Pro Leu Asp Asp Ala Ala Arg
1745                1750                1755                1760
Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys
                1765                1770                1775
Gly Gly Met Leu Ser Leu Ala Leu Asn Glu Asp Ala Val Leu Glu Arg
            1780                1785                1790
Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala Val Asn Gly Pro Thr
            1795                1800                1805
Ala Thr Val Val Ser Gly Asp Pro Val Gln Ile Glu Glu Leu Ala Gln
    1810                1815                1820
Ala Cys Lys Ala Asp Gly Phe Arg Ala Arg Ile Ile Pro Val Asp Tyr
1825                1830                1835                1840
Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu Ser Glu Leu Ala Gln
            1845                1850                1855
Val Leu Ala Gly Leu Ser Pro Gln Ala Pro Arg Val Pro Phe Phe Ser
            1860                1865                1870
Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val Leu Asp Gly Thr Tyr
            1875                1880                1885
Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Ile Glu
    1890                1895                1900
Thr Leu Ala Val Asp Glu Gly Phe Thr His Phe Val Glu Val Ser Ala
1905                1910                1915                1920
His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly Leu Gly
            1925                1930                1935
Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr Ser Leu
            1940                1945                1950
Ala Glu Ala Trp Val Asn Gly Leu Pro Val Ala Trp Thr Ser Leu Leu
    1955                1960                1965
Pro Ala Thr Ala Ser Arg Pro Gly Leu Pro Thr Tyr Ala Phe Gln Ala
    1970                1975                1980
Glu Arg Tyr Trp Leu Glu Asn Thr Pro Ala Ala Leu Ala Thr Gly Asp
1985                1990                1995                2000
Asp Trp Arg Tyr Arg Ile Asp Trp Lys Arg Leu Pro Ala Ala Glu Gly
            2005                2010                2015
Ser Glu Arg Thr Gly Leu Ser Gly Arg Trp Leu Ala Val Thr Pro Glu
            2020                2025                2030
Asp His Ser Ala Gln Ala Ala Ala Val Leu Thr Ala Leu Val Asp Ala
    2035                2040                2045
Gly Ala Lys Val Glu Val Leu Thr Ala Gly Ala Asp Asp Asp Arg Glu
    2050                2055                2060
Ala Leu Ala Ala Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr
2065                2070                2075                2080
Gly Val Val Ser Leu Leu Asp Gly Leu Val Pro Gln Val Ala Trp Val
            2085                2090                2095
Gln Ala Leu Gly Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr
    2100                2105                2110
Gln Gly Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp
            2115                2120                2125
Arg Ala Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro
    2130                2135                2140
Glu Arg Trp Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala
2145                2150                2155                2160
Ala Leu Ala His Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp
            2165                2170                2175
Gln Ile Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg
    2180                2185                2190
Ala Pro Leu His Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly
    2195                2200                2205
Thr Val Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala
    2210                2215                2220
```

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Arg Trp Met Ala His His Gly Ala Glu His Leu Leu Leu Val Ser Arg
2225   2230   2235   2240
Ser Gly Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr
              2245   2250   2255
Ala Ser Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro
          2260   2265   2270
His Ala Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu
          2275   2280   2285
Thr Ala Val Val His Thr Ala Gly Ala Leu Asp Asp Gly Ile Val Asp
      2290   2295   2300
Thr Leu Thr Ala Glu Gln Val Arg Arg Ala His Arg Ala Lys Ala Val
2305   2310   2315   2320
Gly Ala Ser Val Leu Asp Glu Leu Thr Arg Asp Leu Asp Leu Asp Ala
              2325   2330   2335
Phe Val Leu Phe Ser Ser Val Ser Ser Thr Leu Gly Ile Pro Gly Gln
              2340   2345   2350
Gly Asn Tyr Ala Pro His Asn Ala Tyr Leu Asp Ala Leu Ala Ala Arg
          2355   2360   2365
Arg Arg Ala Thr Gly Arg Ser Ala Val Ser Val Ala Trp Gly Pro Trp
      2370   2375   2380
Asp Gly Gly Gly Met Ala Ala Gly Asp Gly Val Ala Glu Arg Leu Arg
2385   2390   2395   2400
Asn His Gly Val Pro Gly Met Asp Pro Glu Leu Ala Leu Ala Ala Leu
              2405   2410   2415
Glu Ser Ala Leu Gly Arg Asp Glu Thr Ala Ile Thr Val Ala Asp Ile
              2420   2425   2430
Asp Trp Asp Arg Phe Tyr Leu Ala Tyr Ser Ser Gly Arg Pro Gln Pro
              2435   2440   2445
Leu Val Glu Glu Leu Pro Glu Val Arg Arg Ile Ile Asp Ala Arg Asp
      2450   2455   2460
Ser Ala Thr Ser Gly Gln Gly Gly Ser Ser Ala Gln Gly Ala Asn Pro
2465   2470   2475   2480
Leu Ala Glu Arg Leu Ala Ala Ala Ala Pro Gly Glu Arg Thr Glu Ile
              2485   2490   2495
Leu Leu Gly Leu Val Arg Ala Gln Ala Ala Ala Val Leu Arg Met Arg
              2500   2505   2510
Ser Pro Glu Asp Val Ala Ala Asp Arg Ala Phe Lys Asp Ile Gly Phe
              2515   2520   2525
Asp Ser Leu Ala Gly Val Glu Leu Arg Asn Arg Leu Thr Arg Ala Thr
          2530   2535   2540
Gly Leu Gln Leu Pro Ala Thr Leu Val Phe Asp His Pro Thr Pro Leu
2545   2550   2555   2560
Ala Leu Val Ser Leu Leu Arg Ser Glu Phe Leu Gly Asp Glu Glu Thr
              2565   2570   ·2575
Ala Asp Ala Arg Arg Ser Ala Ala Leu Pro Ala Thr Val Gly Ala Gly
          2580   2585   2590
Ala Gly Ala Gly Ala Gly Thr Asp Ala Asp Asp Pro Ile Ala Ile
          2595   2600   2605
Val Ala Met Ser Cys Arg Tyr Pro Gly Asp Ile Arg Ser Pro Glu Asp
      2610   2615   2620
Leu Trp Arg Met Leu Ser Glu Gly Gly Glu Gly Ile Thr Pro Phe Pro
2625   2630   2635   2640
Thr Asp Arg Gly Trp Asp Leu Asp Gly Leu Tyr Asp Ala Asp Pro Asp
          2645   2650   2655
Ala Leu Gly Arg Ala Tyr Val Arg Glu Gly Gly Phe Leu His Asp Ala
          2660   2665   2670
Ala Glu Phe Asp Ala Glu Phe Phe Gly Val Ser Pro Arg Glu Ala Leu
          2675   2680   2685
Ala Met Asp Pro Gln Gln Arg Met Leu Leu Thr Thr Ser Trp Glu Ala
      2690   2695   2700
Phe Glu Arg Ala Gly Ile Glu Pro Ala Ser Leu Arg Gly Ser Ser Thr
2705   2710   2715   2720

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Gly Val Phe Ile Gly Leu Ser Tyr Gln Asp Tyr Ala Ala Arg Val Pro
          2725                    2730                    2735
Asn Ala Pro Arg Gly Val Glu Gly Tyr Leu Leu Thr Gly Ser Thr Pro
          2740                    2745                    2750
Ser Val Ala Ser Gly Arg Ile Ala Tyr Thr Phe Gly Leu Glu Gly Pro
          2755                    2760                    2765
Ala Thr Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Thr Ala Leu His
      2770                    2775                    2780
Leu Ala Val Arg Ala Leu Arg Ser Gly Glu Cys Thr Met Ala Leu Ala
2785                    2790                    2795                    2800
Gly Gly Val Ala Met Met Ala Thr Pro His Met Phe Val Glu Phe Ser
          2805                    2810                    2815
Arg Gln Arg Ala Leu Ala Pro Asp Gly Arg Ser Lys Ala Phe Ser Ala
          2820                    2825                    2830
Asp Ala Asp Gly Phe Gly Ala Ala Glu Gly Val Gly Leu Leu Leu Val
          2835                    2840                    2845
Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His Pro Val Leu Ala Val
      2850                    2855                    2860
Val Arg Gly Thr Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr
2865                    2870                    2875                    2880
Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala
          2885                    2890                    2895
Asp Ala Arg Leu Ala Pro Gly Asp Ile Asp Ala Val Glu Thr His Gly
          2900                    2905                    2910
Thr Gly Thr Ser Leu Gly Asp Pro Ile Glu Ala Gln Gly Leu Gln Ala
          2915                    2920                    2925
Thr Tyr Gly Lys Glu Arg Pro Ala Glu Arg Pro Leu Ala Ile Gly Ser
      2930                    2935                    2940
Val Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Ala Ala Gly
2945                    2950                    2955                    2960
Ile Ile Lys Met Val Leu Ala Met Arg His Gly Thr Leu Pro Lys Thr
          2965                    2970                    2975
Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Ala Asn Ser Gly
          2980                    2985                    2990
Leu Ala Leu Val Thr Glu Pro Ile Asp Trp Pro Ala Gly Thr Gly Pro
          2995                    3000                    3005
Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His
3010                    3015                    3020
Val Val Leu Glu Gln Ala Pro Asp Ala Ala Gly Glu Val Leu Gly Ala
3025                    3030                    3035                    3040
Asp Glu Val Pro Glu Val Ser Glu Thr Val Ala Met Ala Gly Thr Ala
          3045                    3050                    3055
Gly Thr Ser Glu Val Ala Glu Gly Ser Glu Ala Ser Glu Ala Pro Ala
          3060                    3065                    3070
Ala Pro Gly Ser Arg Glu Ala Ser Leu Pro Gly His Leu Pro Trp Val
          3075                    3080                    3085
Leu Ser Ala Lys Asp Glu Gln Ser Leu Arg Gly Gln Ala Ala Ala Leu
      3090                    3095                    3100
His Ala Trp Leu Ser Glu Pro Ala Ala Asp Leu Ser Asp Ala Asp Gly
3105                    3110                    3115                    3120
Pro Ala Arg Leu Arg Asp Val Gly Tyr Thr Leu Ala Thr Ser Arg Thr
          3125                    3130                    3135
Ala Phe Ala His Arg Ala Ala Val Thr Ala Ala Asp Arg Asp Gly Phe
      3140                    3145                    3150
Leu Asp Gly Leu Ala Thr Leu Ala Gln Gly Gly Thr Ser Ala His Val
      3155                    3160                    3165
His Leu Asp Thr Ala Arg Asp Gly Thr Thr Ala Phe Leu Phe Thr Gly
      3170                    3175                    3180
Gln Gly Ser Gln Arg Pro Gly Ala Gly Arg Glu Leu Tyr Asp Arg His
3185                    3190                    3195                    3200
Pro Val Phe Ala Arg Ala Leu Asp Glu Ile Cys Ala His Leu Asp Gly
          3205                    3210                    3215
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His Leu Glu Leu Pro Leu Leu Asp Val Met Phe Ala Ala Glu Gly Ser
         3220                3225                3230
Ala Glu Ala Ala Leu Leu Asp Glu Thr Arg Tyr Thr Gln Cys Ala Leu
         3235                3240                3245
Phe Ala Leu Glu Val Ala Leu Phe Arg Leu Val Glu Ser Trp Gly Met
    3250                3255                3260
Arg Pro Ala Ala Leu Leu Gly His Ser Val Gly Glu Ile Ala Ala Ala
3265                3270                3275                3280
His Val Ala Gly Val Phe Ser Leu Ala Asp Ala Ala Arg Leu Val Ala
             3285                3290                3295
Ala Arg Gly Arg Leu Met Gln Glu Leu Pro Ala Gly Gly Ala Met Leu
         3300                3305                3310
Ala Val Gln Ala Ala Glu Asp Glu Ile Arg Val Trp Leu Glu Thr Glu
         3315                3320                3325
Glu Arg Tyr Ala Gly Arg Leu Asp Val Ala Ala Val Asn Gly Pro Glu
    3330                3335                3340
Ala Ala Val Leu Ser Gly Asp Ala Asp Ala Ala Arg Glu Ala Glu Ala
3345                3350                3355                3360
Tyr Trp Ser Gly Leu Gly Arg Arg Thr Arg Ala Leu Arg Val Ser His
             3365                3370                3375
Ala Phe His Ser Ala His Met Asp Gly Met Leu Asp Gly Phe Arg Ala
             3380                3385                3390
Val Leu Glu Thr Val Glu Phe Arg Arg Pro Ser Leu Thr Val Val Ser
         3395                3400                3405
Asn Val Thr Gly Leu Ala Ala Gly Pro Asp Asp Leu Cys Asp Pro Glu
         3410                3415                3420
Tyr Trp Val Arg His Val Arg Gly Thr Val Arg Phe Leu Asp Gly Val
3425                3430                3435                3440
Arg Val Leu Arg Asp Leu Gly Val Arg Thr Cys Leu Glu Leu Gly Pro
             3445                3450                3455
Asp Gly Val Leu Thr Ala Met Ala Ala Asp Gly Leu Ala Asp Thr Pro
             3460                3465                3470
Ala Asp Ser Ala Ala Gly Ser Pro Val Gly Ser Pro Ala Gly Ser Pro
             3475                3480                3485
Ala Asp Ser Ala Ala Gly Ala Leu Arg Pro Arg Pro Leu Leu Val Ala
    3490                3495                3500
Leu Leu Arg Arg Lys Arg Ser Glu Thr Glu Thr Val Ala Asp Ala Leu
3505                3510                3515                3520
Gly Arg Ala His Ala His Gly Thr Gly Pro Asp Trp His Ala Trp Phe
             3525                3530                3535
Ala Gly Ser Gly Ala His Arg Val Asp Leu Pro Thr Tyr Ser Phe Arg
             3540                3545                3550
Arg Asp Arg Tyr Trp Leu Asp Ala Pro Ala Ala Asp Thr Ala Val Asp
    3555                3560                3565
Thr Ala Gly Leu Gly Leu Gly Thr Ala Asp His Pro Leu Leu Gly Ala
    3570                3575                3580
Val Val Ser Leu Pro Asp Arg Asp Gly Leu Leu Leu Thr Gly Arg Leu
3585                3590                3595                3600
Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Leu Gly Ser
             3605                3610                3615
Val Leu Leu Pro Gly Ala Ala Met Val Glu Leu Ala Ala His Ala Ala
         3620                3625                3630
Glu Ser Ala Gly Leu Arg Asp Val Arg Glu Leu Thr Leu Leu Glu Pro
    3635                3640                3645
Leu Val Leu Pro Glu His Gly Gly Val Glu Leu Arg Val Thr Val Gly
    3650                3655                3660
Ala Pro Ala Gly Glu Pro Gly Gly Glu Ser Ala Gly Asp Gly Ala Arg
3665                3670                3675                3680
Pro Val Ser Leu His Ser Arg Leu Ala Asp Ala Pro Ala Gly Thr Ala
             3685                3690                3695
Trp Ser Cys His Ala Thr Gly Leu Leu Ala Thr Asp Arg Pro Glu Leu
             3700                3705                3710
```

Pro Val Ala Pro Asp Arg Ala Ala Met Trp Pro Pro Gln Gly Ala Glu
    3715   3720   3725
Glu Val Pro Leu Asp Gly Leu Tyr Glu Arg Leu Asp Gly Asn Gly Leu
    3730   3735   3740
Ala Phe Gly Pro Leu Phe Gln Gly Leu Asn Ala Val Trp Arg Tyr Glu
3745   3750   3755   3760
Gly Glu Val Phe Ala Asp Ile Ala Leu Pro Ala Thr Thr Asn Ala Thr
            3765   3770   3775
Ala Pro Ala Thr Ala Asn Gly Gly Ser Ala Ala Ala Ala Pro Tyr
            3780   3785   3790
Gly Ile His Pro Ala Leu Leu Asp Ala Ser Leu His Ala Ile Ala Val
    3795   3800   3805
Gly Gly Leu Val Asp Glu Pro Glu Leu Val Arg Val Pro Phe His Trp
    3810   3815   3820
Ser Gly Val Thr Val His Ala Ala Gly Ala Ala Ala Ala Arg Val Arg
3825   3830   3835   3840
Leu Ala Ser Ala Gly Thr Asp Ala Val Ser Leu Ser Leu Thr Asp Gly
            3845   3850   3855
Glu Gly Arg Pro Leu Val Ser Val Glu Arg Leu Thr Leu Arg Pro Val
            3860   3865   3870
Thr Ala Asp Gln Ala Ala Ala Ser Arg Val Gly Gly Leu Met His Arg
    3875   3880   3885
Val Ala Trp Arg Pro Tyr Ala Leu Ala Ser Ser Gly Glu Gln Asp Pro
    3890   3895   3900
His Ala Thr Ser Tyr Gly Pro Thr Ala Val Leu Gly Lys Asp Glu Leu
3905   3910   3915   3920
Lys Val Ala Ala Ala Leu Glu Ser Ala Gly Val Glu Val Gly Leu Tyr
            3925   3930   3935
Pro Asp Leu Ala Ala Leu Ser Gln Asp Val Ala Ala Gly Ala Pro Ala
            3940   3945   3950
Pro Arg Thr Val Leu Ala Pro Leu Pro Ala Gly Pro Ala Asp Gly Gly
        3955   3960   3965
Ala Glu Gly Val Arg Gly Thr Val Ala Arg Thr Leu Glu Leu Leu Gln
    3970   3975   3980
Ala Trp Leu Ala Asp Glu His Leu Ala Gly Thr Arg Leu Leu Leu Val
3985   3990   3995   4000
Thr Arg Gly Ala Val Arg Asp Pro Glu Gly Ser Gly Ala Asp Asp Gly
            4005   4010   4015
Gly Glu Asp Leu Ser His Ala Ala Ala Trp Gly Leu Val Arg Thr Ala
            4020   4025   4030
Gln Thr Glu Asn Pro Gly Arg Phe Gly Leu Leu Asp Leu Ala Asp Asp
        4035   4040   4045
Ala Ser Ser Tyr Arg Thr Leu Pro Ser Val Leu Ser Asp Ala Gly Leu
    4050   4055   4060
Arg Asp Glu Pro Gln Leu Ala Leu His Asp Gly Thr Ile Arg Leu Ala
4065   4070   4075   4080
Arg Leu Ala Ser Val Arg Pro Glu Thr Gly Thr Ala Ala Pro Ala Leu
            4085   4090   4095
Ala Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Gly Leu Gly
        4100   4105   4110
Gly Leu Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg Arg Leu
    4115   4120   4125
Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Asp Glu Leu
    4130   4135   4140
Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala Ala Cys
4145   4150   4155   4160
Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ala Ile Pro
            4165   4170   4175
Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val Leu Ser
        4180   4185   4190
Asp Gly Thr Leu Pro Ser Met Thr Thr Glu Asp Val Glu His Val Leu
        4195   4200   4205

```
Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr Ser Thr
    4210                4215                4220
Pro Ala Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala Ala Ala
4225                4230                4235                4240
Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Ala Asn Ala Thr
            4245                4250                4255
Leu Asp Ala Leu Ala Trp Arg Arg Arg Ala Ala Gly Leu Pro Ala Leu
            4260                4265                4270
Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr Gly Glu
            4275                4280                4285
Leu Gly Gln Ala Asp Leu Arg Arg Met Ser Arg Ala Gly Ile Gly Gly
            4290                4295                4300
Ile Ser Asp Ala Glu Gly Ile Ala Leu Leu Asp Ala Ala Leu Arg Asp
4305                4310                4315                4320
Asp Arg His Pro Val Leu Leu Pro Leu Arg Leu Asp Ala Ala Gly Leu
            4325                4330                4335
Arg Asp Ala Ala Gly Asn Asp Pro Ala Gly Ile Pro Ala Leu Phe Arg
            4340                4345                4350
Asp Val Val Gly Ala Arg Thr Val Arg Ala Arg Pro Ser Ala Ala Ser
            4355                4360                4365
Ala Ser Thr Thr Ala Gly Thr Ala Gly Thr Pro Gly Thr Ala Asp Gly
            4370                4375                4380
Ala Ala Glu Thr Ala Ala Val Thr Leu Ala Asp Arg Ala Ala Thr Val
4385                4390                4395                4400
Asp Gly Pro Ala Arg Gln Arg Leu Leu Leu Glu Phe Val Val Gly Glu
            4405                4410                4415
Val Ala Glu Val Leu Gly His Ala Arg Gly His Arg Ile Asp Ala Glu
            4420                4425                4430
Arg Gly Phe Leu Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu
            4435                4440                4445
Arg Asn Arg Leu Asn Ser Ala Gly Gly Leu Ala Leu Pro Ala Thr Leu
            4450                4455                4460
Val Phe Asp His Pro Ser Pro Ala Ala Leu Ala Ser His Leu Asp Ala
4465                4470                4475                4480
Glu Leu Pro Arg Gly Ala Ser Asp Gln Asp Gly Ala Gly Asn Arg Asn
            4485                4490                4495
Gly Asn Glu Asn Gly Thr Thr Ala Ser Arg Ser Thr Ala Glu Thr Asp
            4500                4505                4510
Ala Leu Leu Ala Gln Leu Thr Arg Leu Glu Gly Ala Leu Val Leu Thr
            4515                4520                4525
Gly Leu Ser Asp Ala Pro Gly Ser Glu Glu Val Leu Glu His Leu Arg
            4530                4535                4540
Ser Leu Arg Ser Met Val Thr Gly Glu Thr Gly Thr Gly Thr Ala Ser
4545                4550                4555                4560
Gly Ala Pro Asp Gly Ala Gly Ser Gly Ala Glu Asp Arg Pro Trp Ala
            4565                4570                4575
Ala Gly Asp Gly Ala Gly Gly Gly Ser Glu Asp Gly Ala Gly Val Pro
            4580                4585                4590
Asp Phe Met Asn Ala Ser Ala Glu Glu Leu Phe Gly Leu Leu Asp Gln
            4595                4600                4605
Asp Pro Ser Thr Asp
    4610
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<210> 32
<211> 11220
<212> DNA
<213> Streptomyces venezuelae

<400> 32

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gtgtccacgg tgaacgaaga gaagtacctc gactacctgc gtcgtgccac ggcggacctc      60
cacgaggccc gtggccgcct ccgcgagctg gaggcgaagg cgggcgagcc ggtggcgatc     120
gtcggcatgg cctgccgcct gcccggcggc gtcgcctcgc ccgaggacct gtggcggctg     180
```

90

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Glu Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val Glu
65                  70                  75                  80
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            100                 105                 110
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94

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            565             570             575
Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp Val Ser
        580             585             590
Lys Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Ser Ala Leu Ser Arg
        595             600             605
Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala
    610             615             620
Pro Thr Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val
625             630             635             640
Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Val Thr Pro Gln
            645             650             655
Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala
            660             665             670
Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser
        675             680             685
Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Ile Ser Leu
    690             695             700
Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg Ile Glu Asn Leu His Gly
705             710             715             720
Leu Ser Ile Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly
            725             730             735
Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala Asp Gly
            740             745             750
Val Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser Ala His
    755             760             765
Val Glu Thr Ile Glu Ser Glu Leu Ala Glu Val Leu Ala Gly Leu Ser
    770             775             780
Pro Arg Thr Pro Glu Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp
785             790             795             800
Ile Thr Glu Pro Val Leu Asp Gly Thr Tyr Trp Tyr Arg Asn Leu Arg
            805             810             815
His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu
        820             825             830
Gly Phe Thr His Phe Ile Glu Val Ser Ala His Pro Val Leu Thr Met
    835             840             845
Thr Leu Pro Glu Thr Val Thr Gly Leu Gly Thr Leu Arg Arg Glu Gln
    850             855             860
Gly Gly Gln Glu Arg Leu Val Thr Ser Leu Ala Glu Ala Trp Thr Asn
865             870             875             880
Gly Leu Thr Ile Asp Trp Ala Pro Val Leu Pro Thr Ala Thr Gly His
            885             890             895
His Pro Glu Leu Pro Thr Tyr Ala Phe Gln Arg Arg His Tyr Trp Leu
            900             905             910
His Asp Ser Pro Ala Val Gln Gly Ser Val Gln Asp Ser Trp Arg Tyr
        915             920             925
```

95

```
Arg Ile Asp Trp Lys Arg Leu Ala Val Ala Asp Ala Ser Glu Arg Ala
    930                 935                 940
Gly Leu Ser Gly Arg Trp Leu Val Val Val Pro Glu Asp Arg Ser Ala
945                 950                 955                 960
Glu Ala Ala Pro Val Leu Ala Ala Leu Ser Gly Ala Gly Ala Asp Pro
            965                 970                 975
Val Gln Leu Asp Val Ser Pro Leu Gly Asp Arg Gln Arg Leu Ala Ala
            980                 985                 990
Thr Leu Gly Glu Ala Leu Ala Ala Ala Gly Gly Ala Val Asp Gly Val
        995                 1000                1005
Leu Ser Leu Leu Ala Trp Asp Glu Ser Ala His Pro Gly His Pro Ala
        1010                1015                1020
Pro Phe Thr Arg Gly Thr Gly Ala Thr Leu Thr Leu Val Gln Ala Leu
1025                1030                1035                1040
Glu Asp Ala Gly Val Ala Ala Pro Leu Trp Cys Val Thr His Gly Ala
            1045                1050                1055
Val Ser Val Gly Arg Ala Asp His Val Thr Ser Pro Ala Gln Ala Met
            1060                1065                1070
Val Trp Gly Met Gly Arg Val Ala Ala Leu Glu His Pro Glu Arg Trp
        1075                1080                1085
Gly Gly Leu Ile Asp Leu Pro Ser Asp Ala Asp Arg Ala Ala Leu Asp
        1090                1095                1100
Arg Met Thr Thr Val Leu Ala Gly Gly Thr Gly Glu Asp Gln Val Ala
1105                1110                1115                1120
Val Arg Ala Ser Gly Leu Leu Ala Arg Arg Leu Val Arg Ala Ser Leu
            1125                1130                1135
Pro Ala His Gly Thr Ala Ser Pro Trp Trp Gln Ala Asp Gly Thr Val
            1140                1145                1150
Leu Val Thr Gly Ala Glu Glu Pro Ala Ala Ala Glu Ala Ala Arg Arg
        1155                1160                1165
Leu Ala Arg Asp Gly Ala Gly His Leu Leu Leu His Thr Thr Pro Ser
        1170                1175                1180
Gly Ser Glu Gly Ala Glu Gly Thr Ser Gly Ala Ala Glu Asp Ser Gly
1185                1190                1195                1200
Leu Ala Gly Leu Val Ala Glu Leu Ala Asp Leu Gly Ala Thr Ala Thr
            1205                1210                1215
Val Val Thr Cys Asp Leu Thr Asp Ala Glu Ala Ala Ala Arg Leu Leu
            1220                1225                1230
Ala Gly Val Ser Asp Ala His Pro Leu Ser Ala Val Leu His Leu Pro
        1235                1240                1245
Pro Thr Val Asp Ser Glu Pro Leu Ala Ala Thr Asp Ala Asp Ala Leu
1250                1255                1260
Ala Arg Val Val Thr Ala Lys Ala Thr Ala Ala Leu His Leu Asp Arg
1265                1270                1275                1280
Leu Leu Arg Glu Ala Ala Ala Ala Gly Gly Arg Pro Pro Val Leu Val
            1285                1290                1295
Leu Phe Ser Ser Val Ala Ala Ile Trp Gly Gly Ala Gly Gln Gly Ala
            1300                1305                1310
Tyr Ala Ala Gly Thr Ala Phe Leu Asp Ala Leu Ala Gly Gln His Arg
            1315                1320                1325
Ala Asp Gly Pro Thr Val Thr Ser Val Ala Trp Ser Pro Trp Glu Gly
        1330                1335                1340
Ser Arg Val Thr Glu Gly Ala Thr Gly Glu Arg Leu Arg Arg Leu Gly
1345                1350                1355                1360
Leu Arg Pro Leu Ala Pro Ala Thr Ala Leu Thr Ala Leu Asp Thr Ala
            1365                1370                1375
Leu Gly His Gly Asp Thr Ala Val Thr Ile Ala Asp Val Asp Trp Ser
        1380                1385                1390
Ser Phe Ala Pro Gly Phe Thr Thr Ala Arg Pro Gly Thr Leu Leu Ala
        1395                1400                1405
Asp Leu Pro Glu Ala Arg Arg Ala Leu Asp Glu Gln Gln Ser Thr Thr
        1410                1415                1420
```

```
Ala Ala Asp Asp Thr Val Leu Ser Arg Glu Leu Gly Ala Leu Thr Gly
1425                1430                1435                1440
Ala Glu Gln Gln Arg Arg Met Gln Glu Leu Val Arg Glu His Leu Ala
          1445                1450                1455
Val Val Leu Asn His Pro Ser Pro Glu Ala Val Asp Thr Gly Arg Ala
          1460                1465                1470
Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn
          1475                1480                1485
Arg Leu Lys Asn Ala Thr Gly Leu Ala Leu Pro Ala Thr Leu Val Phe
          1490                1495                1500
Asp Tyr Pro Thr Pro Arg Thr Leu Ala Glu Phe Leu Leu Ala Glu Ile
1505                1510                1515                1520
Leu Gly Glu Gln Ala Gly Ala Gly Glu Gln Leu Pro Val Asp Gly Gly
          1525                1530                1535
Val Asp Asp Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu Pro
          1540                1545                1550
Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Gly Gly
          1555                1560                1565
Glu Asp Ala Ile Ser Gly Phe Pro Gln Asp Arg Gly Trp Asp Val Glu
          1570                1575                1580
Gly Leu Tyr Asp Pro Asp Pro Asp Ala Ser Gly Arg Thr Tyr Cys Arg
1585                1590                1595                1600
Ala Gly Gly Phe Leu Asp Glu Ala Gly Glu Phe Asp Ala Asp Phe Phe
          .     1605                1610                1615
Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu
          1620                1625                1630
Leu Leu Glu Thr Ser Trp Glu Ala Val Glu Asp Ala Gly Ile Asp Pro
          1635                1640                1645
Thr Ser Leu Gln Gly Gln Gln Val Gly Val Phe Ala Gly Thr Asn Gly
          1650                1655                1660
Pro His Tyr Glu Pro Leu Leu Arg Asn Thr Ala Glu Asp Leu Glu Gly
1665                1670                1675                1680
Tyr Val Gly Thr Gly Asn Ala Ala Ser Ile Met Ser Gly Arg Val Ser
          1685                1690                1695
Tyr Thr Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys
          1700                1705                1710
Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala Leu Arg Lys
          1715                1720                1725
Gly Glu Cys Gly Leu Ala Leu Ala Gly Gly Val Thr Val Met Ser Thr
          1730                1735                1740
Pro Thr Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Glu Asp
1745                1750                1755                1760
Gly Arg Ser Lys Ala Phe Ala Ala Ser Ala Asp Gly Phe Gly Pro Ala
          1765                1770                1775
Glu Gly Val Gly Met Leu Leu Val Glu Arg Leu Ser Asp Ala Arg Arg
          1780                1785                1790
Asn Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln
          1795                1800                1805
Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln
          1810                1815                1820
Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Thr Thr Ala Asp
1825                1830                1835                1840
Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro
          1845                1850                1855
Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Gly Arg Asp Thr
          1860                1865                1870
Glu Gln Pro Leu Arg Leu Gly Ser Leu Lys Ser Asn Ile Gly His Thr
          1875                1880                1885
Gln Ala Ala Ala Gly Val Ser Gly Ile Ile Lys Met Val Gln Ala Met
          1890                1895                1900
Arg His Gly Val Leu Pro Lys Thr Leu His Val Asp Arg Pro Ser Asp
1905                1910                1915                1920
```

97

```
Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr Glu Ala Met
          1925                    1930                    1935
Asp Trp Pro Arg Lys Gln Glu Gly Gly Leu Arg Arg Ala Ala Val Ser
          1940                    1945                    1950
Ser Phe Gly Ile Ser Gly Thr Asn Ala His Ile Val Leu Glu Glu Ala
          1955                    1960                    1965
Pro Val Asp Glu Asp Ala Pro Ala Asp Glu Pro Ser Val Gly Gly Val
          1970                    1975                    1980
Val Pro Trp Leu Val Ser Ala Lys Thr Pro Ala Ala Leu Asp Ala Gln
1985                    1990                    1995                    2000
Ile Gly Arg Leu Ala Ala Phe Ala Ser Gln Gly Arg Thr Asp Ala Ala
          2005                    2010                    2015
Asp Pro Gly Ala Val Ala Arg Val Leu Ala Gly Gly Arg Ala Gln Phe
          2020                    2025                    2030
Glu His Arg Ala Val Ala Leu Gly Thr Gly Gln Asp Asp Leu Ala Ala
          2035                    2040                    2045
Ala Leu Ala Ala Pro Glu Gly Leu Val Arg Gly Val Ala Ser Gly Val
          2050                    2055                    2060
Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly
2065                    2070                    2075                    2080
Met Gly Ala Glu Leu Leu Asp Val Ser Lys Glu Phe Ala Ala Ala Met
          2085                    2090                    2095
Ala Glu Cys Glu Ala Ala Leu Ala Pro Tyr Val Asp Trp Ser Leu Glu
          2100                    2105                    2110
Ala Val Val Arg Gln Ala Pro Gly Ala Pro Thr Leu Glu Arg Val Asp
          2115                    2120                    2125
Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val
          2130                    2135                    2140
Trp Gln His His Gly Val Thr Pro Gln Ala Val Val Gly His Ser Gln
2145                    2150                    2155                    2160
Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Ser Leu Asp Asp
          2165                    2170                    2175
Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Gly Ala His Leu
          2180                    2185                    2190
Ala Gly Gln Gly Gly Met Leu Ser Leu Ala Leu Ser Glu Ala Ala Val
          2195                    2200                    2205
Val Glu Arg Leu Ala Gly Phe Asp Gly Leu Ser Val Ala Ala Val Asn
          2210                    2215                    2220
Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu
2225                    2230                    2235                    2240
Leu Ala Gln Ala Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro
          2245                    2250                    2255
Val Asp Tyr Ala Ser His Ser Ala His Val Glu Thr Ile Glu Ser Glu
          2260                    2265                    2270
Leu Ala Asp Val Leu Ala Gly Leu Ser Pro Gln Thr Pro Gln Val Pro
          2275                    2280                    2285
Phe Phe Ser Thr Leu Glu Gly Ala Trp Ile Thr Glu Pro Ala Leu Asp
          2290                    2295                    2300
Gly Gly Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro
2305                    2310                    2315                    2320
Ala Val Glu Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Val Glu
          2325                    2330                    2335
Val Ser Ala His Pro Val Leu Thr Met Ala Leu Pro Glu Thr Val Thr
          2340                    2345                    2350
Gly Leu Gly Thr Leu Arg Arg Asp Asn Gly Gly Gln His Arg Leu Thr
          2355                    2360                    2365
Thr Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Val Asp Trp Ala
          2370                    2375                    2380
Ser Leu Leu Pro Thr Thr Thr Thr His Pro Asp Leu Pro Thr Tyr Ala
2385                    2390                    2395                    2400
Phe Gln Thr Glu Arg Tyr Trp Pro Gln Pro Asp Leu Ser Ala Ala Gly
          2405                    2410                    2415
```

98

```
Asp Ile Thr Ser Ala Gly Leu Gly Ala Ala Glu His Pro Leu Leu Gly
        2420                2425                2430
Ala Ala Val Ala Leu Ala Asp Ser Asp Gly Cys Leu Leu Thr Gly Ser
        2435                2440                2445
Leu Ser Leu Arg Thr His Pro Trp Leu Ala Asp His Ala Val Ala Gly
    2450                2455                2460
Thr Val Leu Leu Pro Gly Thr Ala Phe Val Glu Leu Ala Phe Arg Ala
2465                2470                2475                2480
Gly Asp Gln Val Gly Cys Asp Leu Val Glu Glu Leu Thr Leu Asp Ala
            2485                2490                2495
Pro Leu Val Leu Pro Arg Arg Gly Ala Val Arg Val Gln Leu Ser Val
        2500                2505                2510
Gly Ala Ser Asp Glu Ser Gly Arg Arg Thr Phe Gly Leu Tyr Ala His
        2515                2520                2525
Pro Glu Asp Ala Pro Gly Glu Ala Glu Trp Thr Arg His Ala Thr Gly
    2530                2535                2540
Val Leu Ala Ala Arg Ala Asp Arg Thr Ala Pro Val Ala Asp Pro Glu
2545                2550                2555                2560
Ala Trp Pro Pro Pro Gly Ala Glu Pro Val Asp Val Asp Gly Leu Tyr
            2565                2570                2575
Glu Arg Phe Ala Ala Asn Gly Tyr Gly Tyr Gly Pro Leu Phe Gln Gly
        2580                2585                2590
Val Arg Gly Val Trp Arg Arg Gly Asp Glu Val Phe Ala Asp Val Ala
        2595                2600                2605
Leu Pro Ala Glu Val Ala Gly Ala Glu Gly Ala Arg Phe Gly Leu His
    2610                2615                2620
Pro Ala Leu Leu Asp Ala Ala Val Gln Ala Ala Gly Ala Gly Arg Gly
2625                2630                2635                2640
Val Arg Arg Gly His Ala Ala Ala Val Arg Leu Glu Arg Asp Leu Leu
            2645                2650                2655
Tyr Ala Val Gly Ala Thr Ala Leu Arg Val Arg Leu Ala Pro Ala Gly
        2660                2665                2670
Pro Asp Thr Val Ser Val Ser Ala Ala Asp Ser Ser Gly Gln Pro Val
    2675                2680                2685
Phe Ala Ala Asp Ser Leu Thr Val Leu Pro Val Asp Pro Ala Gln Leu
    2690                2695                2700
Ala Ala Phe Ser Asp Pro Thr Leu Asp Ala Leu His Leu Leu Glu Trp
2705                2710                2715                2720
Thr Ala Trp Asp Gly Ala Ala Gln Ala Leu Pro Gly Ala Val Val Leu
            2725                2730                2735
Gly Gly Asp Ala Asp Gly Leu Ala Ala Ala Leu Arg Ala Gly Gly Thr
        2740                2745                2750
Glu Val Leu Ser Phe Pro Asp Leu Thr Asp Leu Val Glu Ala Val Asp
        2755                2760                2765
Arg Gly Glu Thr Pro Ala Pro Ala Thr Val Leu Val Ala Cys Pro Ala
    2770                2775                2780
Ala Gly Pro Asp Gly Pro Glu His Val Arg Glu Ala Leu His Gly Ser
2785                2790                2795                2800
Leu Ala Leu Met Gln Ala Trp Leu Ala Asp Glu Arg Phe Thr Asp Gly
            2805                2810                2815
Arg Leu Val Leu Val Thr Arg Asp Ala Val Ala Ala Arg Ser Gly Asp
        2820                2825                2830
Gly Leu Arg Ser Thr Gly Gln Ala Ala Val Trp Gly Leu Gly Arg Ser
        2835                2840                2845
Ala Gln Thr Glu Ser Pro Gly Arg Phe Val Leu Leu Asp Leu Ala Gly
    2850                2855                2860
Glu Ala Arg Thr Ala Gly Asp Ala Thr Ala Gly Asp Gly Leu Thr Thr
2865                2870                2875                2880
Gly Asp Ala Thr Val Gly Gly Thr Ser Gly Asp Ala Ala Leu Gly Ser
            2885                2890                2895
Ala Leu Ala Thr Ala Leu Gly Ser Gly Glu Pro Gln Leu Ala Leu Arg
        2900                2905                2910
```

99

```
Asp Gly Ala Leu Leu Val Pro Arg Leu Ala Arg Ala Ala Ala Pro Ala
        2915                2920                2925
Ala Ala Asp Gly Leu Ala Ala Ala Asp Gly Leu Ala Ala Leu Pro Leu
        2930                2935                2940
Pro Ala Ala Pro Ala Leu Trp Arg Leu Glu Pro Gly Thr Asp Gly Ser
2945                2950                2955                    2960
Leu Glu Ser Leu Thr Ala Ala Pro Gly Asp Ala Glu Thr Leu Ala Pro
            2965                2970                2975
Glu Pro Leu Gly Pro Gly Gln Val Arg Ile Ala Ile Arg Ala Thr Gly
            2980                2985                2990
Leu Asn Phe Arg Asp Val Leu Ile Ala Leu Gly Met Tyr Pro Asp Pro
            2995                3000                3005
Ala Leu Met Gly Thr Glu Gly Ala Gly Val Val Thr Ala Thr Gly Pro
    3010                3015                3020
Gly Val Thr His Leu Ala Pro Gly Asp Arg Val Met Gly Leu Leu Ser
3025                3030                3035                    3040
Gly Ala Tyr Ala Pro Val Val Val Ala Asp Ala Arg Thr Val Ala Arg
            3045                3050                3055
Met Pro Glu Gly Trp Thr Phe Ala Gln Gly Ala Ser Val Pro Val Val
            3060                3065                3070
Phe Leu Thr Ala Val Tyr Ala Leu Arg Asp Leu Ala Asp Val Lys Pro
    3075                3080                3085
Gly Glu Arg Leu Leu Val His Ser Ala Ala Gly Gly Val Gly Met Ala
    3090                3095                3100
Ala Val Gln Leu Ala Arg His Trp Gly Val Glu Val His Gly Thr Ala
3105                3110                3115                    3120
Ser His Gly Lys Trp Asp Ala Leu Arg Ala Leu Gly Leu Asp Asp Ala
            3125                3130                3135
His Ile Ala Ser Ser Arg Thr Leu Asp Phe Glu Ser Ala Phe Arg Ala
            3140                3145                3150
Ala Ser Gly Gly Ala Gly Met Asp Val Val Leu Asn Ser Leu Ala Arg
            3155                3160                3165
Glu Phe Val Asp Ala Ser Leu Arg Leu Leu Gly Pro Gly Gly Arg Phe
    3170                3175                3180
Val Glu Met Gly Lys Thr Asp Val Arg Asp Ala Glu Arg Val Ala Ala
3185                3190                3195                    3200
Asp His Pro Gly Val Gly Tyr Arg Ala Phe Asp Leu Gly Glu Ala Gly
            3205                3210                3215
Pro Glu Arg Ile Gly Glu Met Leu Ala Glu Val Ile Ala Leu Phe Glu
            3220                3225                3230
Asp Gly Val Leu Arg His Leu Pro Val Thr Thr Trp Asp Val Arg Arg
    3235                3240                3245
Ala Arg Asp Ala Phe Arg His Val Ser Gln Ala Arg His Thr Gly Lys
    3250                3255                3260
Val Val Leu Thr Met Pro Ser Gly Leu Asp Pro Glu Gly Thr Val Leu
3265                3270                3275                    3280
Leu Thr Gly Gly Thr Gly Ala Leu Gly Gly Ile Val Ala Arg His Val
            3285                3290                3295
Val Gly Glu Trp Gly Val Arg Arg Leu Leu Leu Val Ser Arg Arg Gly
            3300                3305                3310
Thr Asp Ala Pro Gly Ala Gly Glu Leu Val His Glu Leu Glu Ala Leu
    3315                3320                3325
Gly Ala Asp Val Ser Val Ala Ala Cys Asp Val Ala Asp Arg Glu Ala
    3330                3335                3340
Leu Thr Ala Val Leu Asp Ser Ile Pro Ala Glu His Pro Leu Thr Ala
3345                3350                3355                    3360
Val Val His Thr Ala Gly Val Leu Ser Asp Gly Thr Leu Pro Ser Met
            3365                3370                3375
Thr Ala Glu Asp Val Glu His Val Leu Arg Pro Lys Val Asp Ala Ala
            3380                3385                3390
Phe Leu Leu Asp Glu Leu Thr Ser Thr Pro Gly Tyr Asp Leu Ala Ala
            3395                3400                3405
```

100

```
Phe Val Met Phe Ser Ser Ala Ala Ala Val Phe Gly Gly Ala Gly Gln
    3410                3415                3420
Gly Ala Tyr Ala Ala Ala Asn Ala Thr Leu Asp Ala Leu Ala Trp Arg
3425                3430                3435                3440
Arg Arg Thr Ala Gly Leu Pro Ala Leu Ser Leu Gly Trp Gly Leu Trp
            3445                3450                3455
Ala Glu Thr Ser Gly Met Thr Gly Gly Leu Ser Asp Thr Asp Arg Ser
            3460                3465                3470
Arg Leu Ala Arg Ser Gly Ala Thr Pro Met Asp Ser Glu Leu Thr Leu
            3475                3480                3485
Ser Leu Leu Asp Ala Ala Met Arg Arg Asp Asp Pro Ala Leu Val Pro
    3490                3495                3500
Ile Ala Leu Asp Val Ala Ala Leu Arg Ala Gln Gln Arg Asp Gly Met
3505                3510                3515                3520
Leu Ala Pro Leu Leu Ser Gly Leu Thr Arg Gly Ser Arg Val Gly Gly
            3525                3530                3535
Ala Pro Val Asn Gln Arg Arg Ala Ala Ala Gly Gly Ala Gly Glu Ala
            3540                3545                3550
Asp Thr Asp Leu Gly Gly Arg Leu Ala Ala Met Thr Pro Asp Asp Arg
            3555                3560                3565
Val Ala His Leu Arg Asp Leu Val Arg Thr His Val Ala Thr Val Leu
    3570                3575                3580
Gly His Gly Thr Pro Ser Arg Val Asp Leu Glu Arg Ala Phe Arg Asp
3585                3590                3595                3600
Thr Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Asn
            3605                3610                3615
Ala Ala Thr Gly Leu Arg Leu Pro Ala Thr Leu Val Phe Asp His Pro
    3620                3625                3630
Thr Pro Gly Glu Leu Ala Gly His Leu Leu Asp Glu Leu Ala Thr Ala
    3635                3640                3645
Ala Gly Gly Ser Trp Ala Glu Gly Thr Gly Ser Gly Asp Thr Ala Ser
    3650                3655                3660
Ala Thr Asp Arg Gln Thr Thr Ala Ala Leu Ala Glu Leu Asp Arg Leu
3665                3670                3675                3680
Glu Gly Val Leu Ala Ser Leu Ala Pro Ala Ala Gly Gly Arg Pro Glu
            3685                3690                3695
Leu Ala Ala Arg Leu Arg Ala Leu Ala Ala Ala Leu Gly Asp Asp Gly
            3700                3705                3710
Asp Asp Ala Thr Asp Leu Asp Glu Ala Ser Asp Asp Asp Leu Phe Ser
    3715                3720                3725
Phe Ile Asp Lys Glu Leu Gly Asp Ser Asp Phe
    3730                3735
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ggcatggcct gccgcctgcc gggcggtgtc gcctcgcccg aggacctgtg gcagctggtg       180
gccggggacg gggacgcgat ctcggagttc ccgcaggacc gcggctggga cgtggagggg       240
ctgtacgacc ccgacccgga cgcgtccggc aggacgtact gccggtccgg cggattcctg       300
cacgacgccg gcgagttcga cgccgacttc ttcgggatct cgccgcgcga ggccctcgcc       360
atggacccgc agcagcgact gtccctcacc accgcgtggg aggcgatcga gagcgcgggc       420
atcgacccga cggccctgaa gggcagcggc ctcggcgtct cgtcggcgg ctggcacacc        480
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ccggccctga ccgtggacac ggcctgctcg tcctcgctgg tcgccctgca cctcgccgtg       660
caggccctcc gcaagggcga gtgcgacatg gccctcgccg tggtgtcac ggtcatgccc        720
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101

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aaggcgttcg ccacctcggc ggacggcttc ggccccgcgg agggcgccgg agtcctgctg      840
gtggagcgcc tgtcggacgc ccgccgcaac ggacaccgga tcctcgcggt cgtccgcggc      900
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cagcgcgtca tccgacgggc cctggcggac gcccggctcg cgccgggtga cgtggacgtc     1020
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gccacctacg gccaggagaa gagcagcgaa cagccgctga ggctgggcgc gttgaagtcg     1140
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atgcgccacg gactgctgcc gaagacgctg cacgtcgacg agccctcgga ccagatcgac     1260
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cgcttctggc tgcagagctc cgcgcccacc agcgccgccg acgactggcg ttaccgcgtc     2760
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cagggcgcgg tctccgtcgg acgtctcgac accccgccg accccgaccg ggccatgctc     3120
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cacaccgccg cgcgcaccggg cggcgatccg ctggacgtca ccggcccgga ggacatcgcc     3660
cgcatcctgg gcgcgaagac gagcggcgcc gaggtcctcg acgacctgct ccgcggcact     3720
ccgctggacg ccttcgtcct ctactcctcg aacgccgggg tctggggcag cggcagccag     3780
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gacgaactgg ccaaggccct gagccacgac gagaccttcg tcgccgtggc cgatgtcgac     4020
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tcccccgacc gggtggcccc cggccgtgcc ttcaccgagc tcggcttcga ctcgctgacg     4320
gccgtgcagc tccgcaacca gctctccacg gtggtcggca acaggctccc cgccaccacg     4380
gtcttcgacc acccgacgcc cgccgcactc gccgcgcacc tccacgaggc gtacctcgca     4440
ccggccgagc cggccccgac ggactgggag gggcgggtgc gccgggccct ggccgaactg     4500
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102

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ccccctcgacc ggctgcggga cgcggggggtc ctcgacaccg tcctgcgcct caccggcatc    4560
gagcccgagc cgggttccgg cggttcggac ggcggcgccg ccgaccctgg tgcggagccg    4620
gaggcgtcga tcgacgacct ggacgccgag gccctgatcc ggatggctct cggcccccgt    4680
aacacctga                                                           4689
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<210> 35
<211> 1562
<212> PRT
<213> Streptomyces venezuelae

<400> 35

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Met Ala Asn Asn Glu Asp Lys Leu Arg Asp Tyr Leu Lys Arg Val Thr
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Ala Glu Leu Gln Gln Asn Thr Arg Arg Leu Arg Glu Ile Glu Gly Arg
            20                  25                  30
Thr His Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu Pro Gly
         35                  40                  45
Gly Val Ala Ser Pro Glu Asp Leu Trp Gln Leu Val Ala Gly Asp Gly
      50                  55                  60
Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val Glu Gly
65                  70                  75                  80
Leu Tyr Asp Pro Asp Pro Asp Ala Ser Gly Arg Thr Tyr Cys Arg Ser
                85                  90                  95
Gly Gly Phe Leu His Asp Ala Gly Glu Phe Asp Ala Asp Phe Phe Gly
            100                 105                 110
Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Ser
         115                 120                 125
Leu Thr Thr Ala Trp Glu Ala Ile Glu Ser Ala Gly Ile Asp Pro Thr
   130                 135                 140
Ala Leu Lys Gly Ser Gly Leu Gly Val Phe Val Gly Gly Trp His Thr
145                 150                 155                 160
Gly Tyr Thr Ser Gly Gln Thr Thr Ala Val Gln Ser Pro Glu Leu Glu
                165                 170                 175
Gly His Leu Val Ser Gly Ala Ala Leu Gly Phe Leu Ser Gly Arg Ile
            180                 185                 190
Ala Tyr Val Leu Gly Thr Asp Gly Pro Ala Leu Thr Val Asp Thr Ala
         195                 200                 205
Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala Leu Arg
   210                 215                 220
Lys Gly Glu Cys Asp Met Ala Leu Ala Gly Gly Val Thr Val Met Pro
225                 230                 235                 240
Asn Ala Asp Leu Phe Val Gln Phe Ser Arg Gln Arg Gly Leu Ala Ala
                245                 250                 255
Asp Gly Arg Ser Lys Ala Phe Ala Thr Ser Ala Asp Gly Phe Gly Pro
            260                 265                 270
Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser Asp Ala Arg
         275                 280                 285
Arg Asn Gly His Arg Ile Leu Ala Val Val Arg Gly Ser Ala Val Asn
   290                 295                 300
Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro Ser Gln
305                 310                 315                 320
Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Ala Pro Gly
                325                 330                 335
Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp
            340                 345                 350
Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Glu Lys Ser
         355                 360                 365
Ser Glu Gln Pro Leu Arg Leu Gly Ala Leu Lys Ser Asn Ile Gly His
   370                 375                 380
Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Gln Ala
385                 390                 395                 400
```

                                 103

```
Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu Pro Ser
            405                   410                   415
Asp Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr Glu Ala
            420                   425                   430
Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala Ala Val
            435                   440                   445
Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu Glu Glu
    450                   455                   460
Ala Pro Ala Val Glu Asp Ser Pro Ala Val Glu Pro Pro Ala Gly Gly
465                   470                   475                   480
Gly Val Val Pro Trp Pro Val Ser Ala Lys Thr Pro Ala Ala Leu Asp
            485                   490                   495
Ala Gln Ile Gly Gln Leu Ala Ala Tyr Ala Asp Gly Arg Thr Asp Val
            500                   505                   510
Asp Pro Ala Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr Ala Met
            515                   520                   525
Glu His Arg Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu Arg Asp
    530                   535                   540
Ala Leu Arg Met Pro Glu Gly Leu Val Arg Gly Thr Ser Ser Asp Val
545                   550                   555                   560
Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly
            565                   570                   575
Met Gly Ala Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala Ser Met
            580                   585                   590
Ala Glu Cys Glu Thr Ala Leu Ser Arg Tyr Val Asp Trp Ser Leu Glu
            595                   600                   605
Ala Val Val Arg Gln Glu Pro Gly Ala Pro Thr Leu Asp Arg Val Asp
    610                   615                   620
Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val
625                   630                   635                   640
Trp Gln His His Gly Ile Thr Pro Gln Ala Val Val Gly His Ser Gln
            645                   650                   655
Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp
            660                   665           ,   670
Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu
    675                   680                   685
Ala Gly Lys Gly Gly Met Ile Ser Leu Ala Leu Asp Glu Ala Ala Val
    690                   695                   700
Leu Lys Arg Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala Val Asn
705                   710                   715                   720
Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Glu Glu
            725                   730                   735
Leu Ala Arg Thr Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro
            740     .             745                   750
Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu Lys Glu
            755                   760                   765
Leu Ala Glu Val Leu Ala Gly Leu Ala Pro Gln Ala Pro His Val Pro
    770                   775                   780
Phe Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val Leu Asp
785                   790                   795                   800
Gly Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro
            805                   810                   815
Ala Val Glu Thr Leu Ala Val Asp Gly Phe Thr His Phe Ile Glu Val
            820                   825                   830
Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly
    835                   840                   845
Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr
    850                   855                   860
Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Ile Asp Trp Ala Pro
865                   870     .             875                   880
Ile Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr Tyr Ala
            885                   890                   895
```

104

```
Phe Gln Thr Glu Arg Phe Trp Leu Gln Ser Ser Ala Pro Thr Ser Ala
            900                 905             910
Ala Asp Asp Trp Arg Tyr Arg Val Glu Trp Lys Pro Leu Thr Ala Ser
        915             920             925
Gly Gln Ala Asp Leu Ser Gly Arg Trp Ile Val Ala Val Gly Ser Glu
        930             935             940
Pro Glu Ala Glu Leu Leu Gly Ala Leu Lys Ala Ala Gly Ala Glu Val
945             950             955             960
Asp Val Leu Glu Ala Gly Ala Asp Asp Arg Glu Ala Leu Ala Ala
            965             970             975
Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr Gly Val Val Ser
        980             985             990
Leu Leu Asp Asp Leu Val Pro Gln Val Ala Trp Val Gln Ala Leu Gly
        995             1000            1005
Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr Gln Gly Ala Val
    1010            1015            1020
Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp Arg Ala Met Leu
1025            1030            1035            1040
Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro Glu Arg Trp Ala
            1045            1050            1055
Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala Ala Leu Ala His
        1060            1065            1070
Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp Gln Ile Ala Ile
    1075            1080            1085
Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg Ala Pro Leu His
    1090            1095            1100
Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly Thr Val Leu Ile
1105            1110            1115            1120
Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala Arg Trp Met Ala
            1125            1130            1135
His His Gly Ala Glu His Leu Leu Leu Val Ser Arg Ser Gly Glu Gln
        1140            1145            1150
Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr Ala Ser Gly Ala
        1155            1160            1165
Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro His Ala Met Arg
    1170            1175            1180
Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala Val Val
1185            1190            1195            1200
His Thr Ala Gly Ala Pro Gly Gly Asp Pro Leu Asp Val Thr Gly Pro
            1205            1210            1215
Glu Asp Ile Ala Arg Ile Leu Gly Ala Lys Thr Ser Gly Ala Glu Val
        1220            1225            1230
Leu Asp Asp Leu Leu Arg Gly Thr Pro Leu Asp Ala Phe Val Leu Tyr
    1235            1240            1245
Ser Ser Asn Ala Gly Val Trp Gly Ser Gly Ser Gln Gly Val Tyr Ala
    1250            1255            1260
Ala Ala Asn Ala His Leu Asp Ala Leu Ala Ala Arg Arg Arg Ala Arg
1265            1270            1275            1280
Gly Glu Thr Ala Thr Ser Val Ala Trp Gly Leu Trp Ala Gly Asp Gly
            1285            1290            1295
Met Gly Arg Gly Ala Asp Asp Ala Tyr Trp Gln Arg Arg Gly Ile Arg
        1300            1305            1310
Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala Leu Ser
        1315            1320            1325
His Asp Glu Thr Phe Val Ala Val Ala Asp Val Asp Trp Glu Arg Phe
        1330            1335            1340
Ala Pro Ala Phe Thr Val Ser Arg Pro Ser Leu Leu Leu Asp Gly Val
1345            1350            1355            1360
Pro Glu Ala Arg Gln Ala Leu Ala Ala Pro Val Gly Ala Pro Ala Pro
            1365            1370            1375
Gly Asp Ala Ala Val Ala Pro Thr Gly Gln Ser Ser Ala Leu Ala Ala
        1380            1385            1390
```

105

```
Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu Thr Leu
    1395                 1400                 1405
Val Arg Thr His Ala Ala Ala Val Leu Gly His Ser Ser Pro Asp Arg
    1410                 1415                 1420
Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser Leu Thr
1425                 1430                 1435                 1440
Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn Arg Leu
                1445                 1450                 1455
Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu Ala Ala
                1460                 1465                 1470
His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro Thr Asp
                1475                 1480                 1485
Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu Asp Arg
    1490                 1495                 1500
Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr Gly Ile
1505                 1510                 1515                 1520
Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala Asp Pro
                1525                 1530                 1535
Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu Ala Leu
                1540                 1545                 1550
Ile Arg Met Ala Leu Gly Pro Arg Asn Thr
    1555                 1560
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<210> 36
<211> 4041
<212> DNA
<213> Streptomyces venezuelae

<400> 36
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ggcatgagct gccggttcgc gggcggaatc cggtcccccg aggacctctg ggacgccgtc       180
gccgcgggca aggacctggt ctccgaggta ccggaggagc gcggctggga catcgactcc       240
ctctacgacc cggtgcccgg gcgcaagggc acgacgtacg tccgcaacgc cgcgttcctc       300
gacgacgccg ccggattcga cgcggccttc ttcgggatct cgccgcgcga ggccctcgcc       360
atggacccgc agcagcggca gctcctcgaa gcctctgggg aggtcttcga gcgggccggc       420
atcgaccccg cgtcggtccg cggcaccgac gtcggcgtgt acgtgggctg tggctaccag       480
gactacgcgc cggacatccg ggtcgccccc gaaggcaccg gcggttacgt cgtcaccggc       540
aactcctccg ccgtggcctc cgggcgcatc gcgtactccc tcggcctgga gggacccgcc       600
gtgaccgtgg acacggcgtg ctcctcttcg ctcgtcgccc tgcacctcgc cctgaagggc       660
ctgcggaacg gcgactgctc gacggcactc gtgggcggcg tggccgtcct cgcgacgccg       720
ggcgcgttca tcgagttcag cagccagcag gccatggccg ccgacggccg gaccaagggc       780
ttcgcctcgg cggcggacgg cctcgcctgg ggcgagggcg tcgccgtact cctcctcgaa       840
cggctctccg acgcgcggcg caagggccac cgggtcctgg ccgtcgtgcg cggcagcgcc       900
atcaaccagg acggcgcgag caacggcctc acggctccgc acgggccctc ccagcagcac       960
ctgatccgcc aggccctggc cgacgcgcgg ctcacgtcga gcgacgtgga cgtcgtggag      1020
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cacggggtgc tgccgaagac cctgcacgtg gacgagccga cggaccaggt cgactggtcg      1260
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ccgtggccgg tgtccgcgaa gacctcggcc gcactggacg cccagatcgg gcagctcgcc      1500
gcatacgcgg aagaccgcac ggacgtggat ccggcggtgg ccgcccgcgc cctggtcgac      1560
agccgtacgg cgatggagca ccgcgcggtc gcggtcggcg acagccggga ggcactgcgg      1620
gacgccctgc ggatgccgga aggactggta cggggcacgg tcaccgatcc gggccgggtg      1680
gcgttcgtct tccccggcca gggcacgcag tgggccggca tgggcgccga actcctcgac      1740
agctcacccg aattcgccgc cgccatggcc gaatgcgaga ccgcactctc cccgtacgtc      1800
gactggtctc tcgaagccgt cgtccgacag gctcccagcg caccgacact cgaccgcgtc      1860
gacgtcgtcc agcccgtcac cttcgccgtc atggtctccc tcgccaaggt ctggcagcac      1920
cacggcatca ccccccgaggc cgtcatcggc cactcccagg gcgagatcgc cgccgcgtac      1980
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gtcgccggtg ccctcaccct cgacgacgcc gctcgtgtcg tgaccctccg cagcaagtcc    2040
atcgccgccc acctcgccgg caagggcggc atgatctccc tcgccctcag cgaggaagcc    2100
acccggcagc gcatcgagaa cctccacgga ctgtcgatcg ccgccgtcaa cgggcctacc    2160
gccaccgtgg tttcgggcga ccccacccag atccaagaac ttgctcaggc gtgtgaggcc    2220
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accgtcgtgt tccagcaccc gacgcccgtc gcgctcgccg agcgcatcag cgacgagctg    3060
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gccgaagcct ccgcgttccg cccgcagttc gcctcgcccg aggcctgctc ggagcggctc    3300
gaccccggtgc tgctcgccgg cggtccgacg gaccgggcgg aaggccgtgc cgttctcgtc    3360
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gcccactggg accttccgca caccgtcgcg gacgtgccgg gcgaccactt cacgatgatg    3960
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<210> 37
<211> 1346
<212> PRT
<213> Streptomyces venezuelae

<400> 37
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Met Thr Ser Ser Asn Glu Gln Leu Val Asp Ala Leu Arg Ala Ser Leu
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Lys Glu Asn Glu Glu Leu Arg Lys Glu Ser Arg Arg Arg Ala Asp Arg
            20                  25                  30
Arg Gln Glu Pro Met Ala Ile Val Gly Met Ser Cys Arg Phe Ala Gly
        35                  40                  45
Gly Ile Arg Ser Pro Glu Asp Leu Trp Asp Ala Val Ala Ala Gly Lys
    50                  55                  60
Asp Leu Val Ser Glu Val Pro Glu Glu Arg Gly Trp Asp Ile Asp Ser
65                  70                  75                  80
Leu Tyr Asp Pro Val Pro Gly Arg Lys Gly Thr Thr Tyr Val Arg Asn
                85                  90                  95
Ala Ala Phe Leu Asp Asp Ala Ala Gly Phe Asp Ala Ala Phe Phe Gly
            100                 105                 110
Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Gln Leu
        115                 120                 125
Leu Glu Ala Ser Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Ala
    130                 135                 140
Ser Val Arg Gly Thr Asp Val Gly Val Tyr Val Gly Cys Gly Tyr Gln
145                 150                 155                 160
```

107

```
Asp Tyr Ala Pro Asp Ile Arg Val Ala Pro Glu Gly Thr Gly Gly Tyr
                 165                 170                 175
Val Val Thr Gly Asn Ser Ser Ala Val Ala Ser Gly Arg Ile Ala Tyr
             180                 185                 190
Ser Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser
         195             200                 205
Ser Ser Leu Val Ala Leu His Leu Ala Leu Lys Gly Leu Arg Asn Gly
     210             215                 220
Asp Cys Ser Thr Ala Leu Val Gly Gly Val Ala Val Leu Ala Thr Pro
225             230                 235                 240
Gly Ala Phe Ile Glu Phe Ser Ser Gln Gln Ala Met Ala Ala Asp Gly
             245                 250                 255
Arg Thr Lys Gly Phe Ala Ser Ala Ala Asp Gly Leu Ala Trp Gly Glu
         260             265                 270
Gly Val Ala Val Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Lys
     275             280                 285
Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Ile Asn Gln Asp
     290             295                 300
Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro Ser Gln Gln His
305             310                 315                 320
Leu Ile Arg Gln Ala Leu Ala Asp Ala Arg Leu Thr Ser Ser Asp Val
             325                 330                 335
Asp Val Val Glu Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile
             340                 345                 350
Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Gly Arg Ala Pro Gly
         355                 360                 365
Gln Pro Leu Arg Leu Gly Thr Leu Lys Ser Asn Ile Gly His Thr Gln
     370                 375                 380
Ala Ala Ser Gly Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg
385             390                 395                 400
His Gly Val Leu Pro Lys Thr Leu His Val Asp Glu Pro Thr Asp Gln
             405                 410                 415
Val Asp Trp Ser Ala Gly Ser Val Glu Leu Leu Thr Glu Ala Val Asp
             420                 425                 430
Trp Pro Glu Arg Pro Gly Arg Leu Arg Arg Ala Gly Val Ser Ala Phe
             435                 440                 445
Gly Val Gly Gly Thr Asn Ala His Val Val Leu Glu Glu Ala Pro Ala
     450                 455                 460
Val Glu Glu Ser Pro Ala Val Glu Pro Pro Ala Gly Gly Gly Val Val
465                 470                 475                 480
Pro Trp Pro Val Ser Ala Lys Thr Ser Ala Ala Leu Asp Ala Gln Ile
             485                 490                 495
Gly Gln Leu Ala Ala Tyr Ala Glu Asp Arg Thr Asp Val Asp Pro Ala
         500             505                 510
Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr Ala Met Glu His Arg
     515             520                 525
Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu Arg Asp Ala Leu Arg
     530             535                 540
Met Pro Glu Gly Leu Val Arg Gly Thr Val Thr Asp Pro Gly Arg Val
545             550                 555                 560
Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala
             565                 570                 575
Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala Ala Met Ala Glu Cys
         580             585                 590
Glu Thr Ala Leu Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val
     595                 600                 605
Arg Gln Ala Pro Ser Ala Pro Thr Leu Asp Arg Val Asp Val Val Gln
     610                 615                 620
Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val Trp Gln His
625                 630                 635                 640
His Gly Ile Thr Pro Glu Ala Val Ile Gly His Ser Gln Gly Glu Ile
             645                 650                 655
```

108

```
Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg
            660                 665                 670
Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys
        675                 680                 685
Gly Gly Met Ile Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg
    690                 695                 700
Ile Glu Asn Leu His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr
705                 710                 715                 720
Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln
            725                 730                 735
Ala Cys Glu Ala Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr
            740                 745                 750
Ala Ser His Ser Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp
        755                 760                 765
Val Leu Ala Gly Leu Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser
    770                 775                 780
Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr
785                 790                 795                 800
Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Val Glu
            805                 810                 815
Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala
            820                 825                 830
His Pro Val Leu Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala
        835                 840                 845
Thr Leu Arg Arg Glu Asp Gly Gly Gln His Arg Leu Thr Thr Ser Leu
    850                 855                 860
Ala Glu Ala Trp Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu
865                 870                 875                 880
Pro Ala Thr Gly Ala Leu Ser Pro Ala Val Pro Asp Leu Pro Thr Tyr
            885                 890                 895
Ala Phe Gln His Arg Ser Tyr Trp Ile Ser Pro Ala Gly Pro Gly Glu
            900                 905                 910
Ala Pro Ala His Thr Ala Ser Gly Arg Glu Ala Val Ala Glu Thr Gly
        915                 920                 925
Leu Ala Trp Gly Pro Gly Ala Glu Asp Leu Asp Glu Glu Gly Arg Arg
    930                 935                 940
Ser Ala Val Leu Ala Met Val Met Arg Gln Ala Ala Ser Val Leu Arg
945                 950                 955                 960
Cys Asp Ser Pro Glu Glu Val Pro Val Asp Arg Pro Leu Arg Glu Ile
            965                 970                 975
Gly Phe Asp Ser Leu Thr Ala Val Asp Phe Arg Asn Arg Val Asn Arg
            980                 985                 990
Leu Thr Gly Leu Gln Leu Pro Pro Thr Val Val Phe Gln His Pro Thr
    995                 1000                1005
Pro Val Ala Leu Ala Glu Arg Ile Ser Asp Glu Leu Ala Glu Arg Asn
    1010                1015                1020
Trp Ala Val Ala Glu Pro Ser Asp His Glu Gln Ala Glu Glu Glu Lys
1025                1030                1035                1040
Ala Ala Ala Pro Ala Gly Ala Arg Ser Gly Ala Asp Thr Gly Ala Gly
            1045                1050                1055
Ala Gly Met Phe Arg Ala Leu Phe Arg Gln Ala Val Glu Asp Asp Arg
            1060                1065                1070
Tyr Gly Glu Phe Leu Asp Val Leu Ala Glu Ala Ser Ala Phe Arg Pro
    1075                1080                1085
Gln Phe Ala Ser Pro Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu
    1090                1095                1100
Leu Ala Gly Gly Pro Thr Asp Arg Ala Glu Gly Arg Ala Val Leu Val
1105                1110                1115                1120
Gly Cys Thr Gly Thr Ala Ala Asn Gly Gly Pro His Glu Phe Leu Arg
            1125                1130                1135
Leu Ser Thr Ser Phe Gln Glu Glu Arg Asp Phe Leu Ala Val Pro Leu
    1140                1145                1150
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109

Pro Gly Tyr Gly Thr Gly Thr Gly Thr Gly Thr Ala Leu Leu Pro Ala
        1155   1160   1165
Asp Leu Asp Thr Ala Leu Asp Ala Gln Ala Arg Ala Ile Leu Arg Ala
        1170   1175   1180
Ala Gly Asp Ala Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu
1185   1190   1195   1200
Leu Ala His Glu Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro
                1205   1210   1215
Pro Ala Gly Ile Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu
                1220   1225   1230
Pro Ile Glu Val Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly
        1235   1240   1245
Glu Leu Glu Pro Met Ser Asp Ala Arg Leu Leu Ala Met Gly Arg Tyr
        1250   1255   1260
Ala Arg Phe Leu Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val
1265   1270   1275   1280
Leu Leu Val Arg Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg
                1285   1290   1295
Gly Asp Trp Arg Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val
                1300   1305   1310
Pro Gly Asp His Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala
                1315   1320   1325
Glu Ala Val Leu Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala
        1330   1335   1340
Gly Lys
1345

<210> 38
<211> 1251
<212> DNA
<213> Streptomyces venezuelae

<400> 38
gtgcgccgta cccagcaggg aacgaccgct tctcccccgg tactcgacct cggggccctg   60
gggcaggatt tcgcggccga tccgtatccg acgtacgcga gactgcgtgc cgagggtccg   120
gcccaccggg tgcgcacccc cgaggggggac gaggtgtggc tggtcgtcgg ctacgaccgg   180
gcgcgggcgg tcctcgccga tccccggttc agcaaggact ggcgcaactc cacgactccc   240
ctgaccgagg ccgaggccgc gctcaaccac aacatgctgg agtccgaccc gccgcggcac   300
acccggctgc gcaagctggt ggccccgtgag ttcaccatgc gccgggtcga gttgctgcgg   360
ccccgggtcc aggagatcgt cgacgggctc gtggacgcca tgctggcggc gcccgacggc   420
cgcgccgatc tgatggagtc cctggcctgg ccgctgccga tcaccgtgat ctccgaactc   480
ctcggcgtgc ccgagccgga ccgcgccgcc ttccgcgtct ggaccgacgc cttcgtcttc   540
ccggacgatc ccgcccaggc ccagaccgcc atggccgaga tgagcggcta tctctcccgg   600
ctcatcgact ccaagcgcgg gcaggacggc gaggacctgc tcagcgcgct cgtgcggacc   660
agcgacgagg acggctcccg gctgacctcc gaggagctgc tcggtatggc ccacatcctg   720
ctcgtcgcgg ggcacgagac cacggtcaat ctgatcgcca acggcatgta cgcgctgctc   780
tcgcacccccg accagctggc cgccctgcgg gccgacatga cgctcttgga cggcgcggtg   840
gaggagatgt tgcgctacga gggcccggtg gaatccgcga cctaccgctt cccggtcgag   900
cccgtcgacc tggacggcac ggtcatcccg gccggtgaca cggtcctcgt cgtcctggcc   960
gacgcccacc gcaccccccga gcgcttcccg gacccgcacc gcttcgacat ccgccgggac   1020
accgccggcc atctcgcctt cggccacggc atccacttct gcatcggcgc ccccttggcc   1080
cggttggagg cccggatcgc cgtccgcgcc cttctcgaac gctgcccgga cctcgccctg   1140
gacgtctccc ccggcgaact cgtgtggtat ccgaacccga tgattcgcgg gctcaaggcc   1200
ctgccgatcc gctggcggcg aggacgggag gcgggccgcc gtaccggttg a   1251

<210> 39
<211> 416
<212> PRT
<213> Streptomyces venezuelae

110

<400> 39
Met Arg Arg Thr Gln Gln Gly Thr Thr Ala Ser Pro Pro Val Leu Asp
1   5   10   15
Leu Gly Ala Leu Gly Gln Asp Phe Ala Ala Asp Pro Tyr Pro Thr Tyr
            20   25   30
Ala Arg Leu Arg Ala Glu Gly Pro Ala His Arg Val Arg Thr Pro Glu
        35   40   45
Gly Asp Glu Val Trp Leu Val Val Gly Tyr Asp Arg Ala Arg Ala Val
    50   55   60
Leu Ala Asp Pro Arg Phe Ser Lys Asp Trp Arg Asn Ser Thr Thr Pro
65   70   75   80
Leu Thr Glu Ala Glu Ala Ala Leu Asn His Asn Met Leu Glu Ser Asp
            85   90   95
Pro Pro Arg His Thr Arg Leu Arg Lys Leu Val Ala Arg Glu Phe Thr
            100   105   110
Met Arg Arg Val Glu Leu Leu Arg Pro Arg Val Gln Glu Ile Val Asp
    115   120   125
Gly Leu Val Asp Ala Met Leu Ala Ala Pro Asp Gly Arg Ala Asp Leu
    130   135   140
Met Glu Ser Leu Ala Trp Pro Leu Pro Ile Thr Val Ile Ser Glu Leu
145   150   155   160
Leu Gly Val Pro Glu Pro Asp Arg Ala Ala Phe Arg Val Trp Thr Asp
            165   170   175
Ala Phe Val Phe Pro Asp Asp Pro Ala Gln Ala Gln Thr Ala Met Ala
            180   185   190
Glu Met Ser Gly Tyr Leu Ser Arg Leu Ile Asp Ser Lys Arg Gly Gln
    195   200   205
Asp Gly Glu Asp Leu Leu Ser Ala Leu Val Arg Thr Ser Asp Glu Asp
    210   215   220
Gly Ser Arg Leu Thr Ser Glu Glu Leu Leu Gly Met Ala His Ile Leu
225   230   235   240
Leu Val Ala Gly His Glu Thr Thr Val Asn Leu Ile Ala Asn Gly Met
            245   250   255
Tyr Ala Leu Leu Ser His Pro Asp Gln Leu Ala Ala Leu Arg Ala Asp
            260   265   270
Met Thr Leu Leu Asp Gly Ala Val Glu Glu Met Leu Arg Tyr Glu Gly
    275   280   285
Pro Val Glu Ser Ala Thr Tyr Arg Phe Pro Val Glu Pro Val Asp Leu
    290   295   300
Asp Gly Thr Val Ile Pro Ala Gly Asp Thr Val Leu Val Val Leu Ala
305   310   315   320
Asp Ala His Arg Thr Pro Glu Arg Phe Pro Asp Pro His Arg Phe Asp
            325   330   335
Ile Arg Arg Asp Thr Ala Gly His Leu Ala Phe Gly His Gly Ile His
            340   345   350
Phe Cys Ile Gly Ala Pro Leu Ala Arg Leu Glu Ala Arg Ile Ala Val
            355   360   365
Arg Ala Leu Leu Glu Arg Cys Pro Asp Leu Ala Leu Asp Val Ser Pro
    370   375   380
Gly Glu Leu Val Trp Tyr Pro Asn Pro Met Ile Arg Gly Leu Lys Ala
385   390   395   400
Leu Pro Ile Arg Trp Arg Arg Gly Arg Glu Ala Gly Arg Arg Thr Gly
            405   410   415

<210> 40
<211> 2787
<212> DNA
<213> Streptomyces venezuelae

<400> 40
atgaatctgg tggaacgcga cggggagata gcccatctca gggccgttct tgacgcatcc   60
gccgcaggtg acgggacgct cttactcgtc tccggaccgg ccggcagcgg gaagacggag   120

111

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ctgctgcggt cgctccgccg gctggccgcc gagcgggaga cccccgtctg gtcggtccgg    180
gcgctgccgg gtgaccgcga catccccctg ggcgtcctct gccagttact ccgcagcgcc    240
gaacaacacg gtgccgacac ctccgccgtc cgcgacctgc tggacgccgc ctcgcggcgg    300
gccggaaacc tcacctcccc cgccgacgcg ccgctccgcg tcgacgagac acaccgcctg    360
cacgactggc tgctctccgt ctcccgccgc accccgttcc tcgtcgccgt cgacgacctg    420
acccacgccg acaccgcgtc cctgaggttc ctcctgtact cgccgcccca ccacgaccag    480
ggcggcatcg gcttcgtcat gaccgagcgg gcctcgcagc gcgccggata ccgggtgttc    540
cgcgccgagc tgctccgcca gccgcactgc cgcaacatgt ggctctccgg gcttcccccc    600
agcggggtac gccagttact cgcccactac tacggccccg aggccgccga gcggcgggcc    660
cccgcgtacc acgcgacgac cggcgggaac ccgctgctcc tgcgggcgct gacccaggac    720
cggcaggcct cccacaccac cctcggcgcg gccggcggcg acgagcccgt ccacggcgac    780
gccttcgccc aggccgtcct cgactgcctg caccgcagcg ccgagggcac actggagacc    840
gcccgctggc tcgcggtcct cgaacagtcc gacccgctcc tggtggagcg gctcacggga    900
acgaccgccg ccgccgtcga gcgccacatc caggagctcg ccgccatcgg cctcctggac    960
gaggacggca ccctgggaca gcccgcgatc cgcgaggccg ccctccagga cctgccggcc   1020
ggcgagcgca ccgaactgca ccggcgcgcc gcggagcagc tgcaccggga cggcgccgac   1080
gaggacaccg tggcccgcca cctgctggtc ggcggcgccc ccgacgctcc ctgggcgctg   1140
cccctgctcg aacggggcgc gcagcaggcc ctgttcgacg accgactcga cgacgccttc   1200
cggatcctcg agttcgccgt gcggtcgagc accgacaaca cccagctggc ccgcctcgcc   1260
ccacacctgg tcgcggcctc ctggcggatg aacccgcaca tgacgacccg ggccctcgca   1320
ctcttcgacc ggctcctgag cggtgaactg ccgcccagcc acccggtcat ggccctgatc   1380
cgctgcctcg tctggtacgg gcggctgccc gaggccgccg acgcgctgtc ccggctgcgg   1440
cccagctccg acaacgatgc cttggagctg tcgctcaccc ggatgtggct cgcggcgctg   1500
tgcccgccgc tcctggagtc cctgccggcc acgccggagc cggagcgggg tcccgtcccc   1560
gtacggctcg cgccgcggac gaccgcgctc caggcccagg ccggcgtctt ccagcggggc   1620
ccggacaacg cctcggtcgc gcaggccgaa cagatcctgc agggctgccg gctgtcggag   1680
gagacgtacg aggccctgga cacggccctc ttggtcctcg tccacgccga ccggctcgac   1740
cgggcgctgt tctggtcgga cgccctgctc gccgaggccg tggagcggcg gtcgctcggc   1800
tgggaggcgg tcttcgccgc gacccggggcg atgatcgcga tccgctgcgg cgacctcccg   1860
acggcgcggg agcgggccga gctggcgctc tcccacgcgg cgccggagag ctggggcctc   1920
gccgtgggca tgcccctctc cgcgctgctg ctcgcctgca cggaggccgg cgagtacgaa   1980
caggcggagc gggtcctgcg gcagccggtg ccggacgcga tgttcgactc gcggcacggc   2040
atggagtaca tgcacgcccg gggccgctac tggctggcga cgggccggct gcacgcggcg   2100
ctgggcgagt tcatgctctg cggggagatc ctgggcagct ggaacctcga ccagcccctcg   2160
atcgtgccct ggcggacctc cgccgccgag gtgtacctgc ggctcggcaa ccgccagaag   2220
gccagggcgc tggccgaggc ccagctcgcc ctggtgcggc ccgggcgctc ccgcacccgg   2280
ggtctcaccc tgcgggtcct ggcggcggcg gtggacggcc agcaggcgga cgggctgcac   2340
gccgaggcgg tcgacatgct gcacgacagc ggcgaccggc tcgaacacgc ccgcgcgctc   2400
gccgggatga ccgccacca gcaggcccag ggggacaact accgggcgag gatgacggcg   2460
cggctcgccg gcgacatggc gtgggcctgc ggcgcgtacc cgctggccga ggagatcgtg   2520
ccgggccgcg gcggccgccg ggcgaaggcg gtgagcacgg agctggaact gccgggcggc   2580
ccggacgtcg gcctgctctc ggaggccgaa cgccgggtgg cggccctggc agcccgagga   2640
ttgacgaacc gccagatagc gcgccggctc tgcgtcaccg cgagcacggt cgaacagcac   2700
ctgacgcgcg tctaccgcaa actgaacgtg acccgccgag cagacctccc gatcagcctc   2760
gcccaggaca agtccgtcac ggcctga                                       2787
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<210> 41
<211> 928
<212> PRT
<213> Streptomyces venezuelae

<400> 41

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Met Asn Leu Val Glu Arg Asp Gly Glu Ile Ala His Leu Arg Ala Val
1               5                   10                  15
Leu Asp Ala Ser Ala Ala Gly Asp Gly Thr Leu Leu Leu Val Ser Gly
            20                  25                  30
Pro Ala Gly Ser Gly Lys Thr Glu Leu Leu Arg Ser Leu Arg Arg Leu
        35                  40                  45
Ala Ala Glu Arg Glu Thr Pro Val Trp Ser Val Arg Ala Leu Pro Gly
    50                  55                  60
Asp Arg Asp Ile Pro Leu Gly Val Leu Cys Gln Leu Leu Arg Ser Ala
65                  70                  75                  80
```

112

Glu Gln His Gly Ala Asp Thr Ser Ala Val Arg Asp Leu Leu Asp Ala
                85   90   95
Ala Ser Arg Arg Ala Gly Asn Leu Thr Ser Pro Ala Asp Ala Pro Leu
            100   105   110
Arg Val Asp Glu Thr His Arg Leu His Asp Trp Leu Leu Ser Val Ser
        115   120   125
Arg Arg Thr Pro Phe Leu Val Ala Val Asp Asp Leu Thr His Ala Asp
    130   135   140
Thr Ala Ser Leu Arg Phe Leu Leu Tyr Cys Ala Ala His His Asp Gln
145   150   155   160
Gly Gly Ile Gly Phe Val Met Thr Glu Arg Ala Ser Gln Arg Ala Gly
                165   170   175
Tyr Arg Val Phe Arg Ala Glu Leu Leu Arg Gln Pro His Cys Arg Asn
            180   185   190
Met Trp Leu Ser Gly Leu Pro Pro Ser Gly Val Arg Gln Leu Leu Ala
            195   200   205
His Tyr Tyr Gly Pro Glu Ala Ala Glu Arg Arg Ala Pro Ala Tyr His
    210   215   220
Ala Thr Thr Gly Gly Asn Pro Leu Leu Leu Arg Ala Leu Thr Gln Asp
225   230   235   240
Arg Gln Ala Ser His Thr Thr Leu Gly Ala Ala Gly Gly Asp Glu Pro
                245   250   255
Val His Gly Asp Ala Phe Ala Gln Ala Val Leu Asp Cys Leu His Arg
            260   265   270
Ser Ala Glu Gly Thr Leu Glu Thr Ala Arg Trp Leu Ala Val Leu Glu
            275   280   285
Gln Ser Asp Pro Leu Leu Val Glu Arg Leu Thr Gly Thr Thr Ala Ala
    290   295   300
Ala Val Glu Arg His Ile Gln Glu Leu Ala Ala Ile Gly Leu Leu Asp
305   310   315   320
Glu Asp Gly Thr Leu Gly Gln Pro Ala Ile Arg Glu Ala Ala Leu Gln
                325   330   335
Asp Leu Pro Ala Gly Glu Arg Thr Glu Leu His Arg Arg Ala Ala Glu
            340   345   350
Gln Leu His Arg Asp Gly Ala Asp Glu Asp Thr Val Ala Arg His Leu
            355   360   365
Leu Val Gly Gly Ala Pro Asp Ala Pro Trp Ala Leu Pro Leu Leu Glu
    370   375   380
Arg Gly Ala Gln Gln Ala Leu Phe Asp Asp Arg Leu Asp Asp Ala Phe
385   390   395   400
Arg Ile Leu Glu Phe Ala Val Arg Ser Ser Thr Asp Asn Thr Gln Leu
                405   410   415
Ala Arg Leu Ala Pro His Leu Val Ala Ala Ser Trp Arg Met Asn Pro
            420   425   430
His Met Thr Thr Arg Ala Leu Ala Leu Phe Asp Arg Leu Leu Ser Gly
            435   440   445
Glu Leu Pro Pro Ser His Pro Val Met Ala Leu Ile Arg Cys Leu Val
    450   455   460
Trp Tyr Gly Arg Leu Pro Glu Ala Ala Asp Ala Leu Ser Arg Leu Arg
465   470   475   480
Pro Ser Ser Asp Asn Asp Ala Leu Glu Leu Ser Leu Thr Arg Met Trp
                485   490   495
Leu Ala Ala Leu Cys Pro Pro Leu Leu Glu Ser Leu Pro Ala Thr Pro
            500   505   510
Glu Pro Glu Arg Gly Pro Val Pro Val Arg Leu Ala Pro Arg Thr Thr
        515   520   525
Ala Leu Gln Ala Gln Ala Gly Val Phe Gln Arg Gly Pro Asp Asn Ala
    530   535   540
Ser Val Ala Gln Ala Glu Gln Ile Leu Gln Gly Cys Arg Leu Ser Glu
545   550   555   560
Glu Thr Tyr Glu Ala Leu Glu Thr Ala Leu Leu Val Leu Val His Ala
                565   570   575

113

```
Asp Arg Leu Asp Arg Ala Leu Phe Trp Ser Asp Ala Leu Leu Ala Glu
            580                     585                 590
Ala Val Glu Arg Arg Ser Leu Gly Trp Glu Ala Val Phe Ala Ala Thr
            595                 600                 605
Arg Ala Met Ile Ala Ile Arg Cys Gly Asp Leu Pro Thr Ala Arg Glu
        610             615                 620
Arg Ala Glu Leu Ala Leu Ser His Ala Ala Pro Glu Ser Trp Gly Leu
625             630                 635                     640
Ala Val Gly Met Pro Leu Ser Ala Leu Leu Leu Ala Cys Thr Glu Ala
                645                 650                 655
Gly Glu Tyr Glu Gln Ala Glu Arg Val Leu Arg Gln Pro Val Pro Asp
            660                 665                 670
Ala Met Phe Asp Ser Arg His Gly Met Glu Tyr Met His Ala Arg Gly
        675                 680                 685
Arg Tyr Trp Leu Ala Thr Gly Arg Leu His Ala Ala Leu Gly Glu Phe
        690                 695                 700
Met Leu Cys Gly Glu Ile Leu Gly Ser Trp Asn Leu Asp Gln Pro Ser
705                 710                 715                 720
Ile Val Pro Trp Arg Thr Ser Ala Ala Glu Val Tyr Leu Arg Leu Gly
                725                 730                 735
Asn Arg Gln Lys Ala Arg Ala Leu Ala Glu Ala Gln Leu Ala Leu Val
            740                 745                 750
Arg Pro Gly Arg Ser Arg Thr Arg Gly Leu Thr Leu Arg Val Leu Ala
            755                 760                 765
Ala Ala Val Asp Gly Gln Gln Ala Glu Arg Leu His Ala Glu Ala Val
        770                 775                 780
Asp Met Leu His Asp Ser Gly Asp Arg Leu Glu His Ala Arg Ala Leu
785                 790                 795                 800
Ala Gly Met Ser Arg His Gln Gln Ala Gln Gly Asp Asn Tyr Arg Ala
                805                 810                 815
Arg Met Thr Ala Arg Leu Ala Gly Asp Met Ala Trp Ala Cys Gly Ala
                820                 825                 830
Tyr Pro Leu Ala Glu Glu Ile Val Pro Gly Arg Gly Gly Arg Arg Ala
            835                 840                 845
Lys Ala Val Ser Thr Glu Leu Glu Leu Pro Gly Gly Pro Asp Val Gly
            850                 855                 860
Leu Leu Ser Glu Ala Glu Arg Arg Val Ala Ala Leu Ala Ala Arg Gly
865                 870                 875                 880
Leu Thr Asn Arg Gln Ile Ala Arg Arg Leu Cys Val Thr Ala Ser Thr
                885                 890                 895
Val Glu Gln His Leu Thr Arg Val Tyr Arg Lys Leu Asn Val Thr Arg
                900                 905                 910
Arg Ala Asp Leu Pro Ile Ser Leu Ala Gln Asp Lys Ser Val Thr Ala
            915                 920                 925
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<210> 42
<211> 27
<212> DNA
<213> Streptomyces venezuelae

<400> 42
cccgaattcg ccgccgccat ggccgaa   27

<210> 43
<211> 35
<212> DNA
<213> Streptomyces venezuelae

<400> 43
gtgatgcatc ggctcggcga cggcccagtt ccgct   35

114

```
<210> 44
<211> 45
<212> DNA
<213> Streptomyces venezuelae

<400> 44
atgcatcacc accaccacca ctgagggggc gggcaagtga ccgac                    45

<210> 45
<211> 33
<212> DNA
<213> Streptomyces venezuelae

<400> 45
gggtctagag ctgcaccggc gggtcgtagc gga                                 33

<210> 46
<211> 27
<212> DNA
<213> Streptomyces venezuelae

<400> 46
gaattcatcg aggggcggg caagtga                                         27

<210> 47
<211> 31
<212> DNA
<213> Streptomyces venezuelae

<400> 47
atgcatcagg tcgtcggtca ccgtgggttc t                                   31

<210> 48
<211> 30
<212> DNA
<213> Streptomyces venezuelae

<400> 48
ggatccgcgc cgggatgttc cgcgccctgt                                     30

<210> 49
<211> 31
<212> DNA
<213> Streptomyces venezuelae

<400> 49
aaaatgcatc agaggtctgt cggtcacttg c                                   31

<210> 50
<211> 41
<212> DNA
<213> Streptomyces venezuelae

<400> 50
aaaagatctt gatggtgcag gcgctgcgcc acggggtgct g                        41

<210> 51
<211> 32
<212> DNA
<213> Streptomyces venezuelae
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<400> 51
aaaagatctc caacgaacag ttggtggacg ct   32

<210> 52
<211> 846
<212> DNA
<213> Streptomyces venezuelae

<400> 52
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gtgaccgaca gacctctgaa cgtggacagc ggactgtgga tccggcgctt ccaccccgcg      60
ccgaacagcg cggtgcggct ggtctgcctg ccgcacgccg gcggctccgc cagctacttc     120
ttccgcttct cggaggagct gcacccctcc gtcgaggccc tgtcggtgca gtatccgggc     180
cgccaggacc ggcgtgccga gccgtgtctg gagagcgtcg aggagctcgc cgagcatgtg     240
gtcgcggcca ccgaaccctg gtggcaggag ggccggctgg ccttcttcgg cacagcctc      300
ggcgcctccg tcgccttcga cacggcccgc atcctggaac agcggcacgg ggtacggccc     360
gagggcctgt acgtctccgg tcggcgcgcc ccgtcgctgg cgccggaccg gctcgtccac     420
cagctggacg accgggcgtt cctggccgag atccggcggc tcagcggcac cgacgagcgg     480
ttcctccagg acgacgagct gctgcggctg gtgctgcccg cgctgcgcag cgactacaag     540
gcggcggaga cgtacctgca ccggccgtcc gccaagctca cctgcccggt gatggccctg     600
gccggcgacc gtgacccgaa ggcgccgctg aacgaggtgg ccgagtggcg tcggcacacc     660
agcgggccgt tctgcctccg ggcgtactcc ggcggccact ctacctcaa cgaccagtgg     720
cacgagatct gcaacgacat ctccgaccac ctgctcgtca cccgcggcgc gcccgatgcc     780
cgcgtcgtgc agccccgac cagccttatc gaaggagcgg cgaagagatg cagaaccca     840
cggtga                                                                846
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<210> 53
<211> 281
<212> PRT
<213> Streptomyces venezuelae

<400> 53
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Met Thr Asp Arg Pro Leu Asn Val Asp Ser Gly Leu Trp Ile Arg Arg
1               5                   10                  15
Phe His Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys Leu Pro His
            20                  25                  30
Ala Gly Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu Glu Leu His
        35                  40                  45
Pro Ser Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg
    50                  55                  60
Arg Ala Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val
65                  70                  75                  80
Val Ala Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe
                85                  90                  95
Gly His Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu
            100                 105                 110
Glu Gln Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg
        115                 120                 125
Arg Ala Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp
    130                 135                 140
Arg Ala Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg
145                 150                 155                 160
Phe Leu Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg
                165                 170                 175
Ser Asp Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys
            180                 185                 190
Leu Thr Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala
            195                 200                 205
Pro Leu Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe
    210                 215                 220
Cys Leu Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp
225                 230                 235                 240
```

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```
His Glu Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly
            245             250             255
Ala Pro Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly
            260             265             270
Ala Ala Lys Arg Trp Gln Asn Pro Arg
            275             280
```

<210> 54
<211> 404
<212> DNA
<213> Streptomyces venezuelae

<400> 54
```
tggccgaagt gcccctcgac cggctgcggg acgccggggt cctcgacacc gtcctgcggc    60
tcaccggaat cgagcccgag ccggtgtccg gcggcccggc cgacggcgcc gcggaccccg   120
gtgcggagcc ggagccggag acgtcgatcg acgacctcga cgccgaggcc ctgatccgga   180
tggctctcgg cccgcggaac acctgacccg accgcggcca cggcccgcac accgccaggt   240
gccgtcaggc accacccgca cccctgcccc ccacacgccc acaaccccat ccacgagcgg   300
aagaccacac ccagatgacg agttccaacg agcagttggt ggacgctctg cgcgcctccc   360
tcaaggagaa cgaagaactc cggaaagaga gccgtcgccg ggac                   404
```

<210> 55
<211> 437
<212> DNA
<213> Streptomyces narbonensis

<400> 55
```
tggccgaact gcccctcgac cggctgcggg acgccggggt cctcgacacc gtcctgcgac    60
tcaccggcat cgagcccgag ccggtgcccg gcggcccggg cagcgtcgcc gccggccccg   120
ccgcggatcc ggaaccggag acgtcgatcg acgacctcga cgccgaggcc ctgatccgga   180
tggctctcgg cccgcggaac gcctgagcac ccgccccggc ccgtggctgc cccggccctt   240
gcccgactgc gggccgggcc cggggcccgc acaccgccac gtaccacccc gcaccaccgc   300
cccccacacg cccacaacgc catccacgag cggaagacca cacccagatg acgagttcca   360
acgagcagtt ggtggacgct ctgcgcgcct ccctcaagga gaacgaagaa ctccggaaag   420
agagccgtcg ccgggac                                                 437
```

<210> 56
<211> 327
<212> DNA
<213> Streptomyces venezuelae

<400> 56
```
tcgacggcat cgagcgggac accgccgcgg accggcggac cgcgcagggg gcgaaccagt    60
gaccgacagc gttctgaacg tggacggcaa cctgtggatc cggcgcttcc atccctcgcc   120
gaacagcgcg gtgcgactgg tctgcctgcc ccatgccggc ggctccgcca gctacttctt   180
ccgcttctcg gaggagctcc acccctcggt cgaggccctg tcggtgcagt acccggggccg   240
ccaggaccgg cgtgccgagc cgtgcctgga gagcgtcgag gagctggccg agcacgtggt   300
cgcggccacc gaaccctggt ggcagga                                      327
```

<210> 57
<211> 327
<212> DNA
<213> Streptomyces narbonensis

<400> 57
```
tcgacggcat cgagcgggac accgccgccg ggcggcggac cgcgcagggg gcggaccagt    60
gaccgacaga gttctgaacg tggacagcag cctgtggatc cgacgcttcc acccctcgcc   120
gaacagcgcg gtgcggctgg tctgtctgcc gcacgccggt ggttccgcca gctacttctt   180
ccgcttctcg gaggagctcc acccctcggt cgaggccttg tcggtgcagt accccggccg   240
ccaggaccgg cgtgccgagc cgtgtctgga gaacgtcgag gagctcgccg agcacgtggt   300
cgcggccacc gaagcctggt ggcggga                                      327
```

<210> 58
<211> 25
<212> PRT
<213> A. eutrophus

<400> 58
Met Ala Thr Gly Lys Gly Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser
 1   5   10   15
Gln Pro Phe Lys Val Thr Pro Gly Pro
            20   25

<210> 59
<211> 19
<212> PRT
<213> A. eutrophus

<400> 59
Ala Ala Ala Ser Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr
 1   5   10   15
Pro Gly Pro

<210> 60
<211> 16
<212> PRT
<213> A. eutrophus

<400> 60
Ser Thr Gln Glu Gly Lys Ser Gln Pro Phe Lys Val Thr Pro Gly Pro
 1   5   10   15

<210> 61
<211> 585
<212> PRT
<213> Streptomyces venezuelae

<400> 61
Met Ile Leu Arg Ala Gly Thr Ala Asp Pro Ala Pro Tyr Glu Glu Glu
 1   5   10   15
Ile Pro Gly Tyr Arg Ala Arg Ile Leu Asn Met Ser Asn Lys Asn Asn
            20   25   30
Asp Glu Leu Gln Arg Gln Ala Ser Glu Asn Thr Leu Gly Leu Asn Pro
            35   40   45
Val Ile Gly Ile Arg Arg Lys Asp Leu Leu Ser Ser Ala Arg Thr Val
    50   55   60
Leu Arg Gln Ala Val Arg Gln Pro Leu His Ser Ala Lys His Val Ala
65   70   75   80
His Phe Gly Leu Glu Leu Lys Asn Val Leu Leu Gly Lys Ser Ser Leu
                85   90   95
Ala Pro Glu Ser Asp Asp Arg Arg Phe Asn Asp Pro Ala Trp Ser Asn
            100   105   110
Asn Pro Leu Tyr Arg Arg Tyr Leu Gln Thr Tyr Leu Ala Trp Arg Lys
            115   120   125
Glu Leu Gln Asp Trp Ile Gly Asn Ser Asp Leu Ser Pro Gln Asp Ile
    130   135   140
Ser Arg Gly Gln Phe Val Ile Asn Leu Met Thr Glu Ala Met Ala Pro
145   150   155   160
Thr Asn Thr Leu Ser Asn Pro Ala Ala Val Lys Arg Phe Phe Glu Thr
            165   170   175
Gly Gly Lys Ser Leu Leu Asp Gly Leu Ser Asn Leu Ala Lys Asp Leu
            180   185   190

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```
Val Asn Asn Gly Gly Met Pro Ser Gln Val Asn Met Asp Ala Phe Glu
        195                 200                 205
Val Gly Lys Asn Leu Gly Thr Ser Glu Gly Ala Val Val Tyr Arg Asn
    210                 215                 220
Asp Val Leu Glu Leu Ile Gln Tyr Lys Pro Ile Thr Glu Gln Val His
225                 230                 235                 240
Ala Arg Pro Leu Leu Val Val Pro Pro Gln Ile Asn Lys Phe Tyr Val
            245                 250                 255
Phe Asp Leu Ser Pro Glu Lys Ser Leu Ala Arg Tyr Cys Leu Arg Ser
            260                 265                 270
Gln Gln Gln Thr Phe Ile Ile Ser Trp Arg Asn Pro Thr Lys Ala Gln
        275                 280                 285
Arg Glu Trp Gly Leu Ser Thr Tyr Ile Asp Ala Leu Lys Glu Ala Val
    290                 295                 300
Asp Ala Val Leu Ala Ile Thr Gly Ser Lys Asp Leu Asn Met Leu Gly
305                 310                 315                 320
Ala Cys Ser Gly Gly Ile Thr Cys Thr Ala Leu Val Gly His Tyr Ala
            325                 330                 335
Ala Leu Gly Glu Asn Lys Val Asn Ala Leu Thr Leu Leu Val Ser Val
            340                 345                 350
Leu Asp Thr Thr Met Asp Asn Gln Val Ala Leu Phe Val Asp Glu Gln
        355                 360                 365
Thr Leu Glu Ala Ala Lys Arg His Ser Tyr Gln Ala Gly Val Leu Glu
    370                 375                 380
Gly Ser Glu Met Ala Lys Val Phe Ala Trp Met Arg Pro Asn Asp Leu
385                 390                 395                 400
Ile Trp Asn Tyr Trp Val Asn Asn Tyr Leu Leu Gly Asn Glu Pro Pro
            405                 410                 415
Val Phe Asp Ile Leu Phe Trp Asn Asn Asp Thr Thr Arg Leu Pro Ala
            420                 425                 430
Ala Phe His Gly Asp Leu Ile Glu Met Phe Lys Ser Asn Pro Leu Thr
            435                 440                 445
Arg Pro Asp Ala Leu Glu Val Cys Gly Thr Pro Ile Asp Leu Lys Gln
    450                 455                 460
Val Lys Cys Asp Ile Tyr Ser Leu Ala Gly Thr Asn Asp His Ile Thr
465                 470                 475                 480
Pro Trp Gln Ser Cys Tyr Arg Ser Ala His Leu Phe Gly Gly Lys Ile
            485                 490                 495
Glu Phe Val Leu Ser Asn Ser Gly His Ile Gln Ser Ile Leu Asn Pro
            500                 505                 510
Pro Gly Asn Pro Lys Ala Arg Phe Met Thr Gly Ala Asp Arg Pro Gly
        515                 520                 525
Asp Pro Val Ala Trp Gln Glu Asn Ala Thr Lys His Ala Asp Ser Trp
    530                 535                 540
Trp Leu His Trp Gln Ser Trp Leu Gly Glu Arg Ala Gly Glu Leu Glu
545                 550                 555                 560
Lys Ala Pro Thr Arg Leu Gly Asn Arg Ala Tyr Ala Ala Gly Glu Ala
            565                 570                 575
Ser Pro Gly Thr Tyr Val His Glu Arg
            580                 585
```

<210> 62
<211> 268
<212> PRT
<213> Streptomyces venezuelae

<400> 62

```
Ile Arg Arg Phe His Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys
1               5                   10                  15
Leu Pro His Ala Gly Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu
        20                  25                  30
```

```
Glu Leu His Pro Ser Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg
        35                  40                  45
Gln Asp Arg Arg Ala Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala
    50                  55                  60
Glu His Val Val Ala Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu
65                  70                  75                      80
Ala Phe Phe Gly His Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala
            85                  90                  95
Arg Ile Leu Glu Gln Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val
            100                 105                 110
Ser Gly Arg Arg Ala Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln
            115                 120                 125
Leu Asp Asp Arg Ala Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr
    130                 135                 140
Asp Glu Arg Phe Leu Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro
145                 150                 155                 160
Ala Leu Arg Ser Asp Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro
            165                 170                 175
Ser Ala Lys Leu Thr Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp
            180                 185                 190
Pro Lys Ala Pro Leu Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser
            195                 200                 205
Gly Pro Phe Cys Leu Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn
    210                 215                 220
Asp Gln Trp His Glu Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val
225                 230                 235                 240
Thr Arg Gly Ala Pro Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu
            245                 250                 255
Ile Glu Gly Ala Ala Lys Arg Trp Gln Asn Pro Arg
            260                 265
```

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